EDP industry report and market review

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Volume 6 – December 15, 1970 to October 19, 1971
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Volume 8 – November 27, 1972 to October 11, 1973
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1	9/27/74	IBM communications; price increases; AMA Info 74
2	10/17/74	IBM 3850; update on antitrust
3	10/24/74	IBM/COMSAT; ICL new product line
4	11/6/74	Minicomputer review
5	11/20/74	Virtual storage 370s; Telex documents
6	12/4/74	ICL 2903; DOJ case against IBM and AT&T
7	12/18/74	Loyalty study
8	12/31/74	Preliminary year end results, look at future
9	1/20/75	IBM System/32; entry-level business
10	1/30/75	Telex decision overturned; new minis
11	2/12/75	Burroughs, NCR systems; loyalty wrap-up
12	2/27/75	IBM trial
13	3/13/75	New mini announcements; EFTS-POS update
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15 & 16	4/30/75	REVIEW AND FORECAST
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21	7/7/75	IBM price reductions; DOJ trial starts
22	7/18/75	IBM disks, small systems
23	7/30/75	Xerox quits; COM outlook; Japan Ultra LSI
24	8/19/75	DP service companies; state EDP expenditures

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As of 7/1/74	Issue 4
As of 1/1/75	Issue 18

General-purpose Computers

As of 10/1/74	Issue 5
As of 1/1/75	Issue 15
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• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

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1	9/27/74	IBM communications; price increases; AMA Info 74
2	10/17/74	IBM 3850; update on antitrust
3	10/24/74	IBM/COMSAT; ICL new product line
4	11/6/74	Minicomputer review
5	11/20/74	Virtual storage 370s; Telex documents
6	12/4/74	ICL 2903; DOJ case against IBM and AT&T
7	12/18/74	Loyalty study
8	12/31/74	Preliminary year end results, look at future
9	1/20/75	IBM System/32; entry-level business
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11	2/12/75	Burroughs, NCR systems; loyalty wrap-up
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INTERNATIONAL DATA CORP.
OCT 18 1974
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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" SEPTEMBER 27,1974 • VOL.10,NO.1 P.J.McGOVERN,PUBLISHER

Preview of product and pricing policy?

IBM MAKES IT CLEAR: COMMUNICATIONS IS THE ENVIRONMENT OF THE 1970s; PRICE INCREASE "NOMINAL" AS NEW PRODUCTS FILL OUT TERMINAL LINE

In a very real sense, the significant news was left unstated . . . A new communications standard . . . SDLC . . . is likely to emerge as the communications technique for the mid-1970s and beyond. Superseding IBM's binary synchronous protocol, SDLC is bit rather than character oriented . . . is "transparent," and therefore can handle any data format . . . and for the first time brings IBM users the potential data transmission cost savings inherent in full-duplex operation. -- EDP/IR, Aug. 23, 1973

When all is said and done, IBM's description of its new "Advanced Function for Communications" . . . and the associated Systems Network Architecture (SNA) design concept . . . may be as complicated as first explanations of the DNA molecule a decade ago. And for computer users, it may well be as important.

The 14-page press package announced a "family of highly versatile, general-purpose terminals" plus the "blueprint that enables [users] to expand their communications productivity as well as their ability to develop new and sophisticated computer applications." It essentially said there is method behind everything IBM has been doing of late . . . a new communications environment that requires:

"-- A virtual storage IBM System/370, providing the facilities and services for processing application programs;

"-- Virtual Telecommunications Access Method (VTAM), a high-level program linking terminals and application programs, and helping manage the communications network;

"-- An IBM 3704 or 3705 communications controller and Network Control Program/Virtual Storage, working with VTAM to manage the network;

"-- Synchronous Data Link Control (SDLC), providing efficient and reliable two-way data transmissions;

"-- Terminals with integrated control units, or linked to programmable controllers, automatically handling communications tasks, such as initiating and terminating a transmission."

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"Smooth growth" into teleprocessing

Much of the language sprinkled through IBM's announcement of its total commitment to communications had very similar "spend more with IBM -- save more elsewhere" overtones that first came to light in the virtual storage announcement two years ago (EDP/IR Aug.15,1972). That . . . and the emphasis on new uses for computers . . . new applications. IBM says the SNA communications design will:

- Free computer facilities to process applications since communications functions -- such as transmission line control -- can be distributed throughout the system.

- Reduce communications costs because a variety of terminals will be able to operate over a single line.

- Increase programmer productivity since -- with the ability to install additional terminals at remote locations with little or no modification to existing application programming -- more time can be devoted to developing new applications.

Even if some of this reasoning sounds naive or simplistic, it probably isn't -- especially for the medium-sized and smaller user who is just now considering his entrance into the world of communications. In effect, IBM has said "take advantage of communications -- it is the real thing -- but leave the details to us. We'll make it simple and save you money."

Plenty of new terminals

In the announcement, IBM said "the Advanced Function for Communications family" also includes the 3600 banking system, the 3650 retail system, the 3660 supermarket system, the 3790 communication system. Furthermore, IBM said it was adding SDLC capability to the 3270 display system.

The major part of the announcement, of course, was the new hardware -- incorporating an integrated control unit and designed to operate primarily over networks using Synchronous Data Link Control. Basically:

- The 3767 "communication terminal" -- a desk-top device with a bi-directional printer -- is designed for start-stop line control in addition to SDLC, so it can be used in 2741 networks. An optional feature allows it to function off-line as a calculator/typewriter.

- The 3770 "data communication system" is a series of terminals -- actually a family of interactive or remote-batch equipment with card reader and punch devices, diskette storage, the new bi-directional or a 120 lpm belt printer capability. The equipment can be connected to a binary synchronous transmission line -- "giving users advanced capabilities" until SDLC capability is installed.

Detailed specifications for the terminals are involved: prices range from $161 a month (ETP) for the smaller version of the 3767 up to $965 for a "loaded" 3775, top of four models in the 3770 system, which can operate at speeds of up to 4,800 bits per second. Shipments of the 3770 begin in the fourth quarter of this year, with shipments of the 3767, designed in IBM's Japanese development facility, scheduled for the first quarter of 1975.

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The time gap between announcement and delivery -- much shorter than is usual for IBM -- would seem to be yet another indication of how important IBM considers its unified teleprocessing structure. Either that . . . or IBM has simply "owned up" to what could be considered a potential weakness on its part.

As the market grows . . .

According to market research studies by International Data Corporation, publisher of EDP/IR, the data communications/data entry equipment market segment will grow more rapidly than the overall industry average. The percentage of computers using terminals will grow from an estimated 25% at yearend 1973 to about 35% by yearend 1978. Lest that not sound like much, consider the numbers: The number of general-purpose terminals installed in the U.S. will triple -- from slightly over 300,000 to just under 1 million -- during that time period.

Traditionally, IBM has not been as strong in the terminal marketplace as in most computer industry areas where it offers equipment. (Conversely, because terminals are not such an integral part of the computer system, users have always been more inclined to install equipment made by other than the mainframer . . . from AT&T's Teletype Corp. on down to the horde of terminal manufacturers so visible at any trade show.)

At the present time, IBM supplies only 60% (by number) of the terminals that operate with its computers in the U.S. Thus, it accounts for less than 40% of all terminals operating today. Indeed, IBM has supplied just barely over half the two-thirds of a million general-purpose devices (including keypunches) that operators use for keyboarding computer information.

. . . the pressure builds

And prospects for keeping up with anticipated growth have not been considered the best by some observers. Thus, it's fairly easy to understand the two-fold thrust behind the latest announcement.

- From a product standpoint, IBM has filled out its line, providing to "a wide range of industries the cohesive teleprocessing capabilities . . . previously available only with IBM's industry-specialized terminal systems." The new products look like real workhorses.

- From a philosophy, or strategy standpoint, SDLC seems to be a communications approach that users find attractive, and that other manufacturers will also follow. Thus, IBM moves to a position of leadership in the terminal environment.

Whether this strategy -- and the associated tactics -- proves successful, of course, will not be known for some time. But the stakes are becoming important. Terminal shipments in the U.S. should exceed $650 million this year, and -- especially now that IBM has made its move -- should approach $1 billion in 1975.

MAINFRAME PRICE HIKES WON'T DAMPEN USER DEMAND FOR MORE HARDWARE

When IBM announced that it was raising prices 6%-to-8% on most products (table, page 4), IDC researchers were well into the first phase of a survey of user spending for 1975. Naturally, the big question that needed answering quickly became: Will the 8%-to-10% indicated increase in hardware spending by the largest users

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IBM's 1974 PRICE INCREASE

After IBM made its rather terse announcement of a 6%-to-8% price increase for most of its computer products and services in the U.S., EDP/IR contacted company spokesmen for the details reported below. Rental increases are effective Jan.1, 1975; purchase prices Sept.17, 1974, the day of the announcement. For leases -- the Fixed-Term or Extended-Term Plans for peripherals, the Term Lease Plan (4-year lease) for CPUs -- there are lots of if's and and's . . . but, essentially, leases in effect at the time of the announcement are not affected during their current term; those signed after 9/17/74 go up 1/1/75.

	Rent/Lease	Purchase
CPUs		
370/115	+6%	0%
370/125	6	0
370/135	6	6
370/145	8	8
370/158	8	8
370/168	8	8
370/195	6	6
System/7	6	0
System/3*	8	0
*except Mod.8, but including all 5400 series peripherals		
DAT Box (for 370/155 and 370/165)	NA	6

PERIPHERALS

Note: Virtually all IBM peripheral equipment was affected. Major items are listed below. Notable exceptions are the recently announced 3767 and 3770 terminals and the 3343 Data Module (for the 3340).

	Rent/Lease	Purchase
Terminals		
2260/3270	6	0
2741	6	0
3600/50/60	6	6
3740	6	0

	Rent/Lease	Purchase
PERIPHERALS (cont.)		
Magnetic Tape Equipment		
2401/2420	+6%	+6%
3410/3420	6	0
Disk Equipment		
2311/2312	6	6
2313/2314	6	6
2318/2319	6	0
3330/3333	6	0
3340	6	0
2302	6	6
2305	6	0
Printers		
1403	6	6
3211	6	0
3203/5203	6	0
Communications Controllers		
3704/3705	6	0
2701	6	0
2702/2703	6	6
Card Equipment		
2520	6	6
2540	6	6
2560	6	6

Maintenance -- Increased 8% on all purchased equipment except for the recently announced terminals and the System/3, Model 8.

actually show up as real growth? Or would most of it be absorbed by the price increase -- thereby causing users to re-think priorities and reduce demand. A quick re-survey brought the comforting answer: Yes, the increase will be real. Most of the large users are protected under term leases, or third party arrangements, or

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had already purchased most of their equipment. As a result, hardware budgets on average would have to be increased less than 2% to compensate for the price increases imposed or expected from mainframe suppliers.

These aren't yet statistically valid results, but are from samples that normally prove to be indicative of the universe. IDC will continue its surveys, and extend them across the universe of users so that spending can be analyzed and reported after the first of the year. Meanwhile, though, some of the early results give an interesting insight into computer use in the mid-1970s.

There have been slight price adjustments in the past, but the actions of fall, 1974, constitute really the first cost-of-living increase that has ever been generally imposed on computer users. Thus it comes as somewhat of a surprise to find that users seem to be prepared for the price hike -- at least resigned to it.

Much of this attitude may well be a reflection of the "spend it on equipment, not on people" philosophy IBM seems to be spreading (story, page 1). Not only do users report they will go ahead and add equipment; they also say that new hiring will be minimal. About half the additional spending will be on communications oriented equipment and -- almost as a corollary -- spending on data entry personnel will decrease as organizations turn to on-line data entry.

Users obviously aren't cheering the price increases. But in a time of rampant inflation, they seem to have accepted them. Furthermore, there seems to be an underlying idea that data processing not only is necessary . . . it holds the key to economies of operation that far outweigh a few extra rental dollars.

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Info 74 . . . directions?

ARE CORPORATION MANAGERS ADRIFT IN A SEA OF INFORMATION?
CONFERENCE STRESSES MANAGEMENT RESPONSIBILITY WITHIN A "FUTURE ENVIRONMENT"

It was a hot, muggy Gotham Monday, September 9, when Alfred Eisenpreis, a high-level New York City administrator, opened the American Management Association's (AMA) Info 74 by patting the corporate audience on the back: "American Management has been this country's secret weapon for more than half a century."

But that pat turned out to sting a little, when a few paragraphs later he cut to the root of what others have called the "management gap" and what, as it turned out, was a chord that would reverberate through a week of Info 74 conferences, seminars, and exposition:

> From a description of the sessions to come over the next four days, I am impressed by the repetition of the idea that management cannot abdicate its responsibility for information systems. That's a valid indictment. They have left technology to the technicians -- and thereby diminished their influence on a system over which they need to maintain direction and control.

Later that morning, James L. Hayes, President and Chief Executive of AMA added a post-Watergate riff to that passage with a discussion of management's new "ethical posture" . . . a posture inherent with being custodians of vast amounts of data, with being guardians of the information waterhole. He also stressed the dangers of a "dead-in-the-water" approach to riding out the "future shock" waves caused by the swift and changing advances in information processing.

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And, when Hayes mentioned the "generation gap" that seems to exist between EDP professionals and corporate management -- not to mention another gap separating that management and the legislative and judicial bodies that are beginning to take a more active interest in corporation "ethical posture" -- most of the heads in the audience bobbed in agreement. They were the EDP types.

From the podium

The packed lecture sessions and pointed questions from Info attendees showed that they were there to do more than just "kick the tires" of the equipment offerings on the Coliseum floor or bask in the proliferation of acronyms that peppered the booths where softer products were on display. They were there to learn.

That thrust of Info 74 -- the charge to management to control information processing intelligently and ethically -- was felt from the EDP room ramrod who told EDP/IR "I only wish my boss were here," to the session speakers, who addressed that charge, even in the more brass tacks seminars. Some random examples:

Data Base Management. Here, the decision to go to DBM, or even which hardware configuration to use, is not the hardest for a company to make. Rather, because of the money involved and severity of commitment, the question of system software is the kicker. Do you buy it or build it? How general or specialized should it be? What unforeseen applications will arise, and how do you prepare for them? As one systems director for a large insurance company that had implemented DBM with software concocted in-house said, "We have stumbled along the way, and are constantly anguished with doubts over the wisdom of our choice. In moments of quiet reflection, however . . . we feel that the commitment to DBM and our choice of software tools has been fortunate."

Software. As highlighted by the success of structured programming, management can no longer look upon the writing of software as a free-wheeling exercise of mathematical dance. It costs too much. Actually, according to one speaker, what makes structured programming so successful is nothing any more innovative than requiring management to define the goals and objectives of the software project much more meticulously and exactly than in the old days. "Well, you know, something along these lines," will no longer hack it as a management directive to the EDP department. In his words, "management techniques of a rigorous variety have been slow in coming. . . . The biggest problem is the external view of a programming project, and the greatest source of inefficiency in producing computer programs is in not producing the right product."

Autotransaction/On-line Data Entry. All that glitters isn't gold, as users and speakers exploring this nook of the EDP realm seemed to stress. Management's first big hurdle is the initial decision of whether or not even to go to an AT or on-line system. Is it worth it? While most of those with opinions think "yes" -- or at least that competition and the nature of progress make the move inevitable -- there are still questions of "when" and "to what degree" to answer. For some of the retailers, grocers, and bankers feeling the squeeze between today's sagging business conditions and tomorrow's Universal Price Code and Electronic Funds Transfer environment, those questions are anything but nit-pickers.

Data Communications/Networking. Again, the first commandment handed down to users appeared to say "be sure you want it." One moderator recalled when some grandiose plans for a computer communications set-up from New Jersey to Manhattan bit the dust because his company "discovered that a wide band Volkswagen

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could move that data faster than this very expensive data link." And if networking gets the green light, then managers are advised to take a few tips from Nader's Raiders and become wary and informed consumers before stepping on the gas. In other words, plan plan plan.

Ironically, and perhaps because of a very structured management setup -- where responsibility is clearly delineated and objectives thought out precisely and tactically -- and a knack for coming up with systems "designed by geniuses for use by idiots," the US Army came off as a good illustration of the cold, logical approach to weaving computers into nets. (Well, only a slight gleam in those brass eyes, anyway.) The step-by-step plans for implementing the World Wide Military Command Control System extend all the way to 1995 and seem to be well thought out in terms of exactly what is wanted from the system.

The medium, the message

And so it went. If there was an underlying and sometimes unspoken theme to Info 74 it was this: Indeed, we live in a MacLuhanesque world. The impact of electronic data processing may lie less in the actual data that is bandied about by machinery than in the lifestyle changes an electronic revolution brings. As the invention of the printing press allowed a literate minority to exchange views over things written in books -- while the shape of the language, the customs of civilization, and the face of the land changed about them -- so too with the development of electronic media -- including the computer. Since revolutions -- be they political, industrial, or electronic -- have a habit of running amok, responsible and clear thinking leaders must take control if we expect sense to be made out of the technological activity around us.

From the import of what was said at Info 74, that control must be exercised by corporation management at the highest level; and from what was seen and heard at Info 74 -- intent brows, hard-nosed queries -- it will be.

Down the aisle . . .

To stroll through the aisles on the third and fourth floor of the New York Coliseum was to wander through a carnival of software packages, service organization pitches, terminals and networking equipment, turnkey DBM systems, consulting publications, and so on.

Companies like Sanders, Bunker Ramo, Tymshare, Decision Data, Hazeltine, Intelligent Memory Systems, MRI Systems, Tycom, Compuserve, and others used Info as a forum for introducing new products . . . most of which were enhancements or logical extentions of existing wares. Some that weren't included Inforex's System 5000, (EDP/IR, Sept. 11,1974), Entrex's new low price (and slightly finicky) Optical Document Scanner, and Calspan's fingerprint sleuth, Fingerscan.

And, while some of the products introduced were interesting -- such as Decision Data's intelligent and gabby card-reading terminals aimed at the IBM System/3 market -- or just plain fun -- like the New York Times Information Bank -- all were certainly overshadowed by the IBM announcements during the week. But did it matter?

Amidst the clack of line printers, the clicking of keyboard devices, and the animated talk of salesmen, it was the quiet question that came through the loudest. "How do you hold the reins, and where are we going?"

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• ADDING TO THE POST LABOR DAY PICKUP in new product announcements, Burroughs says it has new versions of its top-of-the-line B 7700 computer ready for delivery and three new models of medium-size B 4700s on the drawing board for production a year from now. The Motor City mainframer claims that the new offerings can upgrade system performance anywhere from two to four times that of the older models. The reasons cited are the use of new bipolar semiconductor main memory -- which results in faster access times -- twice as much main memory as before, more I/O channels per processor, and enhancement of operating system software into its sixth generation.

The four new B 7700s, which are designed to replace the four old B 7700s, range in price from $3.7 million to $9.4 million and are oriented toward multiprocessing configurations. For instance, the biggest model, the B 7780, has four CPUs and two I/O processors in its basic system lash-up. Each of the four models can be expanded to a total of eight processors in any CPU-I/O combination desired. The three new B 4700s, which are intended as upward extentions rather than replacements to that product line, will run from $1.2 million to $4 million and also be oriented for use in a multiprocessing environment. Biggest of the triad is the B 4792, which comes with two CPUs, 600K bytes of main memory, 36 I/O channels, and a file protect memory which allows multiple processors to share securely common data files.

The operating system changes -- resulting in an upgraded version of Burroughs' well-acclaimed Master Control Program -- provide the software changes to match the hardware changes . . . as well as insure that user software will remain viable up the Burroughs product staircase.

• UNIDATA HAS ONCE AGAIN TAPPED ITS UNCLE PHILIP for a product to call its own. The three company combine of CSII, Siemens, and Philips has announced its new Unidata 300 office computer -- which is manufactured by Philips -- and claims its marketing targets will be those small businesses going to computerized data processing for the first time and, to some extent, bigger companies that could use it in a networking capacity. Unidata's only other joint product is its 7.720 computer -- machine equivalent to an IBM 360/20 -- also primarily a Philips manufacturing effort. Although Unidata will announce three new 7000 series computers this month in Paris, they won't be displaying them . . . so how long before Unidata can iron out its internecine problems and actually ship some bigger, more powerful follow-ons to its two lonely products remains to be seen.

• HUGGING CLOSE TO THE IBM DISK DRIVE BUSINESS, Memorex announced that it has come up with a way to attach its 100 and 200 megabyte disk drive modules directly to the Integrated Storage Control units (ISC) of IBM 370/145s, 158s, and 168s. The company claims to be the first independent peripheral manufacturer to offer this PCM capability. In addition, the Memorex 3673 Disk Controller, which interfaces the Memorex disk drives with the ISC, allows for 3- and 4-channel string switching, as opposed to IBM's 2-channel capability.

• STEAMING VALIANTLY AGAINST THE BALANCE OF PAYMENTS TIDE, according to U.S. Department of Commerce figures, were exports of business machines -- some $1.3 billion during the first half of 1974, of which $980 million was computers or related equipment. The positive trade balance from business machines logged out at $853 million for 1974's first six months -- up 54% from the year before, and 100% from the year before that. Sounds good but, alas, it's more like a Pyrrhic victory . . . the total U.S. energy related deficit, spurred by the worst month ever, hit $2.1 billion this month.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" OCTOBER 17, 1974 • VOL.10, NO.2 P.J.McGOVERN, PUBLISHER

Antitrust glimmers - page 5

IBM'S 3850, NEE "OAK," PROVIDES 472 BILLION BYTES; MASS STORAGE DEVICE APPLIES VIRTUAL STORAGE CONCEPT TO 3330

Not so long ago, the introduction of virtual storage provided greatly increased storage capabilities for System/370 computers. And Advanced Function for Communications, which is a logical extention of the virtual storage base, provides one teleprocessing network for many uses. Now the 3850 Mass Storage System extends the virtual storage concept to direct access storage devices.

Virtual Storage, Advanced Function for Communications, the Mass Storage System -- three powerful links to the computing potential of the Seventies.

from a full page ad
The Wall Street Journal
October 15, 1974

With that, International Business Machines Corporation -- otherwise known as IBM or just the "Giant" -- slipped the veil from its long-awaited "Project Oak" for Journal readers to ponder . . . and in the process provided a periscopic glimpse into the latter 1970s as seen through the IBM lens.

It's a futurescape of data communication canals linking vast data base reservoirs . . . with virtual storage, advanced function for communications, mass storage, and the still-hazy FS as building blocks . . . all with IBM nameplates.

Touted as up to ten times cheaper than equivalent disk storage, "Oak" -- officially called the IBM 3850 Mass Storage System -- welds a new-media tape cartridge and the familiar 3330 disk system into an archival storage net that promises to hold up to 472 billion bytes on line for 370/145s and up . . . and extend disk system capacity in a manner analagous to virtual storage and main memory.

What's more, the 3850 promises to stir a flurry of sparks for peripheral users and manufacturers alike. The 2"x4" cartridge -- shaped almost like a large bullet -- could set a new de facto industry standard. And if this blessing on mass storage brings acceptance to the 3850 and its soon-to-come independently made reflections. tape and disk drive manufacturers are sure to feel it, one way or another.

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With IBM mass storage arriving so closely on the heels of the new IBM 3767 and 3770 terminals, a picture emerges . . . one of the mainframer composing a score for the future with symphonic precision -- in spite of occasional dissonant notes from the courtrooms and the offices on Wall Street. From the introduction of SDLC to the latest announcements to the future possibility of IBM satellites in space, the beat goes on . . . and when FS comes along -- if indeed it isn't half here already -- another stanza to IBM's "Ever Onward" will be complete.

The nuts and bolts of mass storage

In a nutshell, the new Mass Storage System takes information stored on an array of the new data cartridges and shuttles it to and from the CPU's disk system. The CPU initiates the requirement for a certain file and if that file is not already on a disk pack, it's automatically transferred from the cartridge library to an awaiting disk pack . . . where it can be used by the processor. When the processor is done, any changes to the file are written on the cartridge and the disk is then free to accept new information from the Mass Storage System. Appropriate software, called the Mass Communicator, is provided, as well as options under VSAM for data base security.

Specific components of the 3850 Mass Storage System are:

- Data Cartridges. About 770 inches of tape are wound inside each cartridge with information on the 3" wide surface being stored in the 3336 disk pack format. Two cartridges, called a mass storage volume, can hold up to 100 megabytes: equivalent of a disk pack. Each costs $20.

- 3851 Mass Storage Facility. The MSF, connected to the CPU and the 3830 control unit for the 3330 disk system and housing the data cartridges (up to 4720 of them), consists of:

  + *Accessors*. Two each per MSF pluck the data cartridges out of their honeycomb-like bins for operation of the data recorders.

  + *Data Recorders*. Each MSF has from one to four pairs, each pair operating under one controller. Units come with high speed search capability for maximum file loading of the cartridges.

  + *Data Access Station*. This is the physical plant of the MSF and warehouse for the data cartridges. It permits manual entry and removal of the cartridges.

  + *Mass Storage Control*. This is the brain that controls the MSF and data transfer to and from it . . . including assignment of disk space for migrating data, accepting requests from the CPU, and performing various error check and recovery features. There are two series, one with an extra MSC for back-up operations.

- 3830 Model 3 Storage Control and 3330 Disk Storage System. The controller acts as data traffic manager between the CPU and the 3330 system and between the 3851 MSF and the 3330 system. Buffer storage allows for simultaneous communication with both the CPU and the MSF. A staging adapter feature, available for 370s which have an Integrated Storage Controller, takes the place of the 3830 Model 3.

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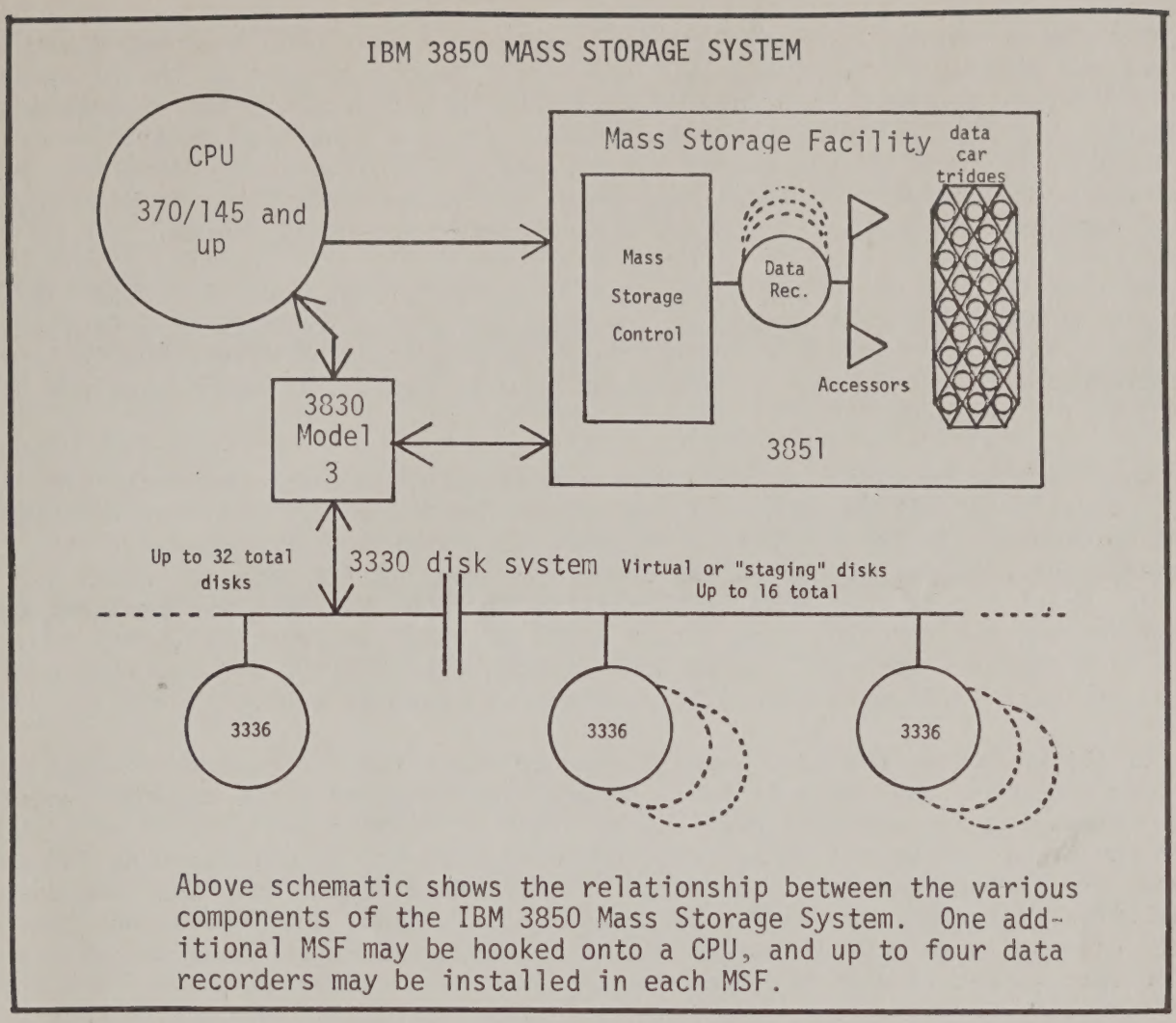

Above schematic shows the relationship between the various components of the IBM 3850 Mass Storage System. One additional MSF may be hooked onto a CPU, and up to four data recorders may be installed in each MSF.

Virtual Disk

As it stands, up to 32 disk drives may be attached to a 3830 Storage Control. Under the Mass Storage System, up to 16 of those may be designated as virtual or "staging" drives . . . tablets for the 3851 MSF to write upon. The MSF -- by assigning multiple addresses to those "staging" drives -- can use each of them as if it were three. Hence, in a full-blown hook-up of 32 drives with 16 "staged" a 3830 -- and therefore the CPU -- would see 64 drives. Ergo virtual disk.

The biggest time lag in the system's operation would occur when the information on a data cartridge has to be loaded onto a disk. Mechanical fetching can take from 3 to 8 seconds, while loading and unloading a data cartridge from the data recorders about ten.

Taping up mass storage?

The idea isn't all that new . . . nor was VS when IBM consecrated the technique Burroughs and RCA had used for years. There's the Grumman Masstape for instance, a one trillion bit "jukebox" of quickly accessed tapes, which is still on the drawing boards . . . and CalComp's Xytex On-line Tape Library which is off the boards and on the market. (The only mainframer on the scene so far is CDC, with its Scroll expected to be introduced next year.)

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But IBM -- which, incidentally, had telegraphed last week's announcement by seeking and winning a competitive bid for a mass memory project at the Goddard Space Center -- is the Giant. So, will its new Mass Storage System -- carrying a price tag that has the largest configuration costing a cool $1.3 million -- take its place as the bull of the market . . . a market of government, financial, and insurance institutions with large data bases and basements filling up with tape reels? And will that bull find a china shop along peripheral avenue?

Neither CalComp nor Grumman thinks so. In fact, they both claim that an IBM sanction on their bohemian corner of the data processing industry is a feather in its cap. "Heck, we think it's great," said the president of Xytex, the CalComp subsidiary that manufactures the automated tape library. "It means that now we have Mother's approval."

Backing that sentiment up -- and gleefully stretching out under the IBM price umbrella -- CalComp then went and raised its prices for the tape library by 8% for lease, 15% for purchase. Grumman, too, stated that prices for its Masstape, which is due on the market about the time the IBM 3850 is, are under review. Model A's of the IBM system start at $10,600 (ETP) for the smallest configuration and run through three larger sizes in $5000 increments. Model B's, which have the back-up Mass Storage Control, start at $13,900 and increase similarly. MAC cost 17.5% more than ETP, purchase 45 times as much.

If the advent of the 3850 doesn't seem to shake two of its mass storage competitors too much, what does it bode, though, for the tape drive manufacturers? Well, CalComp points out that with high-density 6250 bpi tape up to 93 million bytes can be stored on one reel. This compares with the 10 million that IBM says is what its average user of tapes keeps on an average reel. The fast tape may actually be faster for processing large sequential files. And, users that currently possess large tape libraries may not want to switch to a new medium . . . or for that matter have so much information on-line. Potter Instrument and Storage Technology Corporation -- two leaders in the tape drive business -- have said in print that they see no threat from the IBM Mass Storage System. Xytex' president, B.W. Holmbraker, puts it this way, "IBM's not really selling new-medium data cartridges, or even mass storage. What they're selling is virtual disk."

What about disk, then?

If he's right, are the disk drive manufacturers in trouble? Probably not, since IBM is still heavily committed to that business. A hint of the company's view of mass storage and the disk business lies in this slightly prophetic quote from EDP/IR, May 30,1974. An IBM General Products Division analyst speaks:

> *"Many installations will approach mass storage through disk evolution," the IBMer said. Asked whether he was implying that IBM, for its part intended to ignore mass storage and protect its "hotcakes" business in disk drives, he replied only that "no one should find any implication in what I said."*

. . . unless he's looking for a clue to an IBM strategy that would exploit both mass storage and disk drives . . . unless he's looking for "Oak" . . . and further, unless he's looking for another measure to that IBM score for the future that adds to the refrain of teleprocessing, data communications, networking, and ultimately -- FS.

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Update on antitrust

IS THE U.S. VS IBM TRIAL HEADED FOR A CONSENT DECREE?

After several days of heavy powwowing, IBM and the U.S. Department of Justice reached a significant agreement in the pretrial phase of the antitrust suit currently underway in New York's Southern District Court. The crack in the glacier-like proceedings came at a pretrial conference before Judge David N. Edelstein on October 4.

The accord concerned information IBM had heretofore denied the Justice Department -- or at least had offered in the unpalatable form of a 17-million-document sandwich -- describing IBM's installed equipment base on a system versus boxcount basis. Reversing previous contentions that the information was unavailable or at least outdated, the big mainframer quietly acquiesced. For its part, the DOJ withdrew objections to answering a set of IBM Interrogatories in which the government was required to indicate into which market thousands of specified EDP products fell.

But that wasn't the news. What was, was IBM's conciliatory stance in the matter, hinting at a possible speed-up of the case -- and maybe a consent decree before trial.

Although prohibited by the Court from making any statements to the press concerning the trial, IBM's counsel, Thomas A. Barr, may have been using the courtroom as a forum when he gratuitously offered the following:

> I think the only thing I perhaps ought to add -- and I hope this is not unjustified optimism; we work very hard; we worked two nights until almost midnight . . . I think we have been successful in solving a very large problem, that we ought to address ourselves to some of the other problems . . . so I think we have made a much more productive use of this week than we might have made if we tried to litigate issues that I think at bottom were really not that much in dispute.

Watching the clock

The Judge, of course, was pleased. Under the reins of Attorney General Ramsey Clark, the Justice Department initiated proceedings against IBM way back on January 17, 1969, and from then on the case has dragged through the interminable process of pretrial discovery, deposition-taking, and the legalistic wrangling inherent in such a kaleidoscopic suit. Since he assumed responsibility for the case nearly three years ago, Judge Edelstein's overriding concern -- next to the fair and accurate application of the law -- has been the conclusion of the trial within a reasonable time frame.

At times he's had to reprimand both sides in an effort to keep his grip on the hourglass, but his determination to try the case expeditiously -- and soon -- seems undaunted. Almost a year ago, for instance, he put down rumors that the case would never go to trial because of its cumbersome bulk by stating his intent to prove that the legal system "is so advanced and so sophisticated that there is no case that is unmanageable and cannot go to trial. And proving that will be as important as the eventual outcome of this case." Largely as a result of Judge Edelstein's efforts, the original October 7, 1974, starting date for the trial has slipped only sixty days or so.

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As for the agreement last week -- which eliminated the need for lengthy evidentiary hearings -- the Judge was doubly glad because, in his words, "I was not at all certain that at the conclusion . . . I would know much more than I knew before we started."

Triable issues

Less than a week before the October 4 conference, the Department of Justice filed a final Statement of Triable Issues . . . marking a breakdown in efforts to arrive at a joint statement and capping almost two years of DOJ effort to refine its initial tab. That statement, submitted to the Court September 30, was a blunderbuss, including just about every antitrust offense ever pinned on the Giant's grey, pinstripe lapel.

Briefly the statements covered:

- *Market Definition.* As it arose in the Telex case, what constitutes a market, how does one measure a market, and what then determines a monopoly in that market?

- *Intent to Monopolize.* Did IBM demonstrate intent to monopolize any market by practices related to pricing, leasing, maintenance, product announcement or development, customer or supplier relations, or educational allowances? (Delineations follow in the DOJ Statements.)

- *Bundling.* As brought up in the Control Data Case, what effect did IBM's policy of bundling -- packing a combination of equipment and services under a single price tag -- have on its market control, and what was IBM's intent in doing so?

- *Fighting Machines.* Again as in the CDC case, were low-profit or long-lead-time 360s and 2319s introduced to restrain competition by misleading potential users as to their availability and capability?

- *Educational Allowance.* Has IBM used discounts, equipment grants, or monetary grants awarded to various universities to increase its domination of any market?

- *Peripherals.* As unearthed in the Telex case, did IBM produce certain peripherals in a predatory manner designed to restrain competition, such as with the 2319 disk drives? Did the introduction of FTP and ETP leasing throttle competition?

- *Leasing.* Did IBM mount a campaign, as alleged in the Greyhound case, to stress the leasing of its equipment as opposed to the purchasing of it? And was that a campaign to raise competitive barriers by creating extreme capital requirements?

IBM's answer to the DOJ charges was a pugnacious affidavit objecting to "new issues" raised by the government and requesting the Court reject them "as flagrantly untimely and unreasonable." The "new issues" were those concerning IBM's conduct since the initial filing of the antitrust suit . . . and if the Court agrees with Barr's conclusion that introduction of the issues will require new discovery and deposition-seeking, then the IBM legal battalion may have raised a pertinent point.

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Although there are fears (stemming from a consent decree entered in 1956 between the DOJ and IBM) that an out-of-court settlement might not whittle away enough of IBM's alleged monopoly . . . or, from the government's point of view, simply look bad to a public somewhat more cynical than in the days before "the ITT case" and "Watergate" became well known buzz words. Still, a mutual agreement between the trustbusters and perhaps the world's juiciest target might be the happiest ending to the drama.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" OCTOBER 17, 1974 • VOL.10, NO.2 P.J.McGOVERN, PUBLISHER

Antitrust glimmers - page 5

IBM'S 3850, NEE "OAK," PROVIDES 472 BILLION BYTES; MASS STORAGE DEVICE APPLIES VIRTUAL STORAGE CONCEPT TO 3330

Not so long ago, the introduction of virtual storage provided greatly increased storage capabilities for System/370 computers. And Advanced Function for Communications, which is a logical extention of the virtual storage base, provides one teleprocessing network for many uses. Now the 3850 Mass Storage System extends the virtual storage concept to direct access storage devices.

Virtual Storage, Advanced Function for Communications, the Mass Storage System -- three powerful links to the computing potential of the Seventies.

from a full page ad
The Wall Street Journal
October 15, 1974

With that, International Business Machines Corporation -- otherwise known as IBM or just the "Giant" -- slipped the veil from its long-awaited "Project Oak" for Journal readers to ponder . . . and in the process provided a periscopic glimpse into the latter 1970s as seen through the IBM lens.

It's a futurescape of data communication canals linking vast data base reservoirs . . . with virtual storage, advanced function for communications, mass storage, and the still-hazy FS as building blocks . . . all with IBM nameplates.

Touted as up to ten times cheaper than equivalent disk storage, "Oak" -- officially called the IBM 3850 Mass Storage System -- welds a new-media tape cartridge and the familiar 3330 disk system into an archival storage net that promises to hold up to 472 billion bytes on line for 370/145s and up . . . and extend disk system capacity in a manner analagous to virtual storage and main memory.

What's more, the 3850 promises to stir a flurry of sparks for peripheral users and manufacturers alike. The 2"x4" cartridge -- shaped almost like a large bullet -- could set a new de facto industry standard. And if this blessing on mass storage brings acceptance to the 3850 and its soon-to-come independently made reflections. tape and disk drive manufacturers are sure to feel it, one way or another.

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With IBM mass storage arriving so closely on the heels of the new IBM 3767 and 3770 terminals, a picture emerges . . . one of the mainframer composing a score for the future with symphonic precision -- in spite of occasional dissonant notes from the courtrooms and the offices on Wall Street. From the introduction of SDLC to the latest announcements to the future possibility of IBM satellites in space, the beat goes on . . . and when FS comes along -- if indeed it isn't half here already -- another stanza to IBM's "Ever Onward" will be complete.

The nuts and bolts of mass storage

In a nutshell, the new Mass Storage System takes information stored on an array of the new data cartridges and shuttles it to and from the CPU's disk system. The CPU initiates the requirement for a certain file and if that file is not already on a disk pack, it's automatically transferred from the cartridge library to an awaiting disk pack . . . where it can be used by the processor. When the processor is done, any changes to the file are written on the cartridge and the disk is then free to accept new information from the Mass Storage System. Appropriate software, called the Mass Communicator, is provided, as well as options under VSAM for data base security.

Specific components of the 3850 Mass Storage System are:

- Data Cartridges. About 770 inches of tape are wound inside each cartridge with information on the 3" wide surface being stored in the 3336 disk pack format. Two cartridges, called a mass storage volume, can hold up to 100 megabytes: equivalent of a disk pack. Each costs $20.

- 3851 Mass Storage Facility. The MSF, connected to the CPU and the 3830 control unit for the 3330 disk system and housing the data cartridges (up to 4720 of them), consists of:

  + *Accessors*. Two each per MSF pluck the data cartridges out of their honeycomb-like bins for operation of the data recorders.

  + *Data Recorders*. Each MSF has from one to four pairs, each pair operating under one controller. Units come with high speed search capability for maximum file loading of the cartridges.

  + *Data Access Station*. This is the physical plant of the MSF and warehouse for the data cartridges. It permits manual entry and removal of the cartridges.

  + *Mass Storage Control*. This is the brain that controls the MSF and data transfer to and from it . . . including assignment of disk space for migrating data, accepting requests from the CPU, and performing various error check and recovery features. There are two series, one with an extra MSC for back-up operations.

- 3830 Model 3 Storage Control and 3330 Disk Storage System. The controller acts as data traffic manager between the CPU and the 3330 system and between the 3851 MSF and the 3330 system. Buffer storage allows for simultaneous communication with both the CPU and the MSF. A staging adapter feature, available for 370s which have an Integrated Storage Controller, takes the place of the 3830 Model 3.

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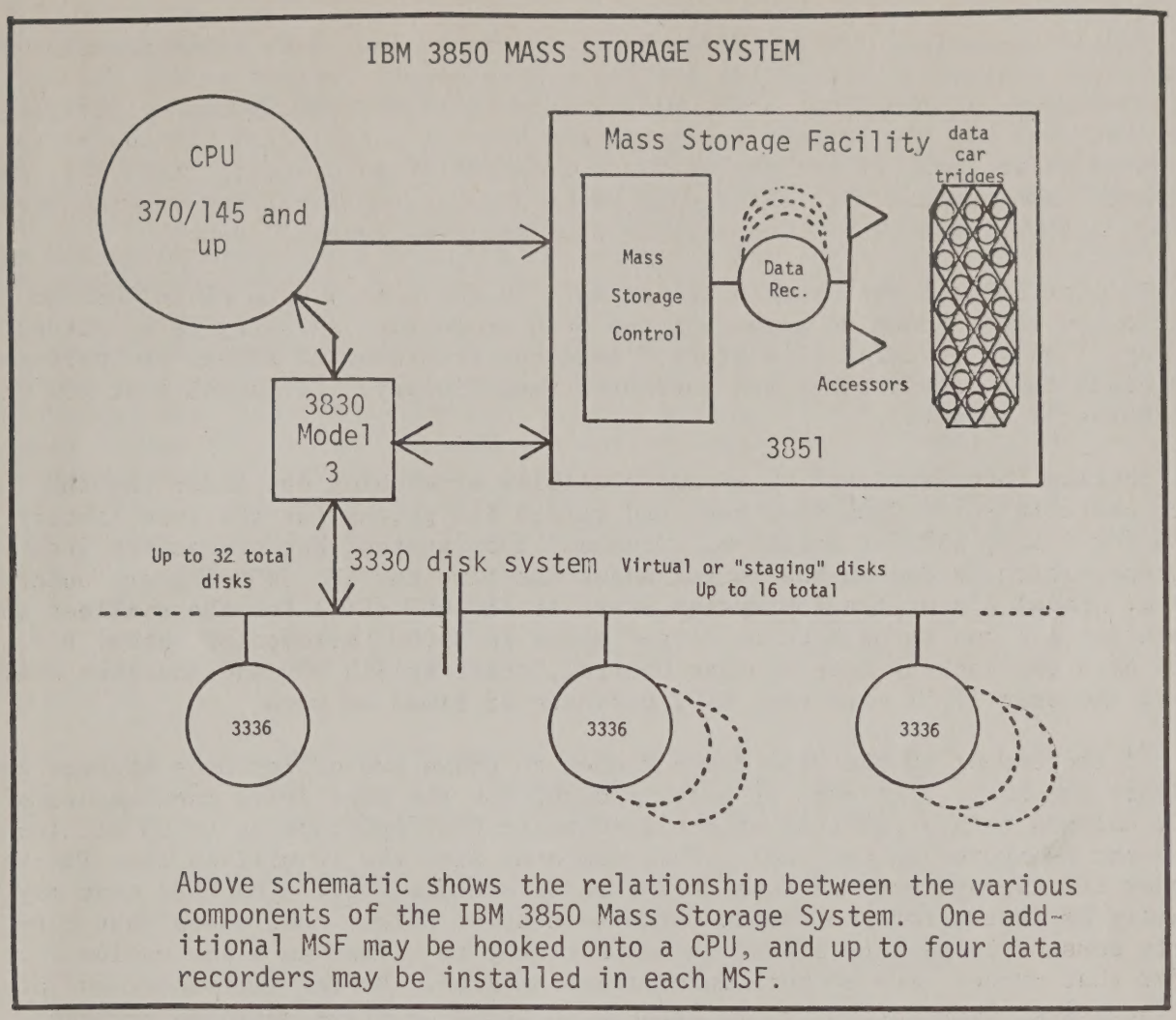

Above schematic shows the relationship between the various components of the IBM 3850 Mass Storage System. One additional MSF may be hooked onto a CPU, and up to four data recorders may be installed in each MSF.

Virtual Disk

As it stands, up to 32 disk drives may be attached to a 3830 Storage Control. Under the Mass Storage System, up to 16 of those may be designated as virtual or "staging" drives . . . tablets for the 3851 MSF to write upon. The MSF -- by assigning multiple addresses to those "staging" drives -- can use each of them as if it were three. Hence, in a full-blown hook-up of 32 drives with 16 "staged" a 3830 -- and therefore the CPU -- would see 64 drives. Ergo virtual disk.

The biggest time lag in the system's operation would occur when the information on a data cartridge has to be loaded onto a disk. Mechanical fetching can take from 3 to 8 seconds, while loading and unloading a data cartridge from the data recorders about ten.

Taping up mass storage?

The idea isn't all that new . . . nor was VS when IBM consecrated the technique Burroughs and RCA had used for years. There's the Grumman Masstape for instance, a one trillion bit "jukebox" of quickly accessed tapes, which is still on the drawing boards . . . and CalComp's Xytex On-line Tape Library which is off the boards and on the market. (The only mainframer on the scene so far is CDC, with its Scroll expected to be introduced next year.)

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But IBM -- which, incidentally, had telegraphed last week's announcement by seeking and winning a competitive bid for a mass memory project at the Goddard Space Center -- is the Giant. So, will its new Mass Storage System -- carrying a price tag that has the largest configuration costing a cool $1.3 million -- take its place as the bull of the market . . . a market of government, financial, and insurance institutions with large data bases and basements filling up with tape reels? And will that bull find a china shop along peripheral avenue?

Neither CalComp nor Grumman thinks so. In fact, they both claim that an IBM sanction on their bohemian corner of the data processing industry is a feather in its cap. "Heck, we think it's great," said the president of Xytex, the CalComp subsidiary that manufactures the automated tape library. "It means that now we have Mother's approval."

Backing that sentiment up -- and gleefully stretching out under the IBM price umbrella -- CalComp then went and raised its prices for the tape library by 8% for lease, 15% for purchase. Grumman, too, stated that prices for its Masstape, which is due on the market about the time the IBM 3850 is, are under review. Model A's of the IBM system start at $10,600 (ETP) for the smallest configuration and run through three larger sizes in $5000 increments. Model B's, which have the back-up Mass Storage Control, start at $13,900 and increase similarly. MAC cost 17.5% more than ETP, purchase 45 times as much.

If the advent of the 3850 doesn't seem to shake two of its mass storage competitors too much, what does it bode, though, for the tape drive manufacturers? Well, CalComp points out that with high-density 6250 bpi tape up to 93 million bytes can be stored on one reel. This compares with the 10 million that IBM says is what its average user of tapes keeps on an average reel. The fast tape may actually be faster for processing large sequential files. And, users that currently possess large tape libraries may not want to switch to a new medium . . . or for that matter have so much information on-line. Potter Instrument and Storage Technology Corporation -- two leaders in the tape drive business -- have said in print that they see no threat from the IBM Mass Storage System. Xytex' president, B.W. Holmbraker, puts it this way, "IBM's not really selling new-medium data cartridges, or even mass storage. What they're selling is virtual disk."

What about disk, then?

If he's right, are the disk drive manufacturers in trouble? Probably not, since IBM is still heavily committed to that business. A hint of the company's view of mass storage and the disk business lies in this slightly prophetic quote from EDP/IR, May 30,1974. An IBM General Products Division analyst speaks:

> *"Many installations will approach mass storage through disk evolution," the IBMer said. Asked whether he was implying that IBM, for its part intended to ignore mass storage and protect its "hotcakes" business in disk drives, he replied only that "no one should find any implication in what I said."*

. . . unless he's looking for a clue to an IBM strategy that would exploit both mass storage and disk drives . . . unless he's looking for "Oak" . . . and further, unless he's looking for another measure to that IBM score for the future that adds to the refrain of teleprocessing, data communications, networking, and ultimately -- FS.

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Update on antitrust

IS THE U.S. VS IBM TRIAL HEADED FOR A CONSENT DECREE?

After several days of heavy powwowing, IBM and the U.S. Department of Justice reached a significant agreement in the pretrial phase of the antitrust suit currently underway in New York's Southern District Court. The crack in the glacier-like proceedings came at a pretrial conference before Judge David N. Edelstein on October 4.

The accord concerned information IBM had heretofore denied the Justice Department -- or at least had offered in the unpalatable form of a 17-million-document sandwich -- describing IBM's installed equipment base on a system versus boxcount basis. Reversing previous contentions that the information was unavailable or at least outdated, the big mainframer quietly acquiesced. For its part, the DOJ withdrew objections to answering a set of IBM Interrogatories in which the government was required to indicate into which market thousands of specified EDP products fell.

But that wasn't the news. What was, was IBM's conciliatory stance in the matter, hinting at a possible speed-up of the case -- and maybe a consent decree before trial.

Although prohibited by the Court from making any statements to the press concerning the trial, IBM's counsel, Thomas A. Barr, may have been using the courtroom as a forum when he gratuitously offered the following:

> I think the only thing I perhaps ought to add -- and I hope this is not unjustified optimism; we work very hard; we worked two nights until almost midnight . . . I think we have been successful in solving a very large problem, that we ought to address ourselves to some of the other problems . . . so I think we have made a much more productive use of this week than we might have made if we tried to litigate issues that I think at bottom were really not that much in dispute.

Watching the clock

The Judge, of course, was pleased. Under the reins of Attorney General Ramsey Clark, the Justice Department initiated proceedings against IBM way back on January 17, 1969 , and from then on the case has dragged through the interminable process of pretrial discovery, deposition-taking, and the legalistic wrangling inherent in such a kaleidoscopic suit. Since he assumed responsibility for the case nearly three years ago, Judge Edelstein's overriding concern -- next to the fair and accurate application of the law -- has been the conclusion of the trial within a reasonable time frame.

At times he's had to reprimand both sides in an effort to keep his grip on the hourglass, but his determination to try the case expeditiously -- and soon -- seems undaunted. Almost a year ago, for instance, he put down rumors that the case would never go to trial because of its cumbersome bulk by stating his intent to prove that the legal system "is so advanced and so sophisticated that there is no case that is unmanageable and cannot go to trial. And proving that will be as important as the eventual outcome of this case." Largely as a result of Judge Edelstein's efforts, the original October 7, 1974, starting date for the trial has slipped only sixty days or so.

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As for the agreement last week -- which eliminated the need for lengthy evidentiary hearings -- the Judge was doubly glad because, in his words, "I was not at all certain that at the conclusion . . . I would know much more than I knew before we started."

Triable issues

Less than a week before the October 4 conference, the Department of Justice filed a final Statement of Triable Issues . . . marking a breakdown in efforts to arrive at a joint statement and capping almost two years of DOJ effort to refine its initial tab. That statement, submitted to the Court September 30, was a blunderbuss, including just about every antitrust offense ever pinned on the Giant's grey, pinstripe lapel.

Briefly the statements covered:

- *Market Definition.* As it arose in the Telex case, what constitutes a market, how does one measure a market, and what then determines a monopoly in that market?

- *Intent to Monopolize.* Did IBM demonstrate intent to monopolize any market by practices related to pricing, leasing, maintenance, product announcement or development, customer or supplier relations, or educational allowances? (Delineations follow in the DOJ Statements.)

- *Bundling.* As brought up in the Control Data Case, what effect did IBM's policy of bundling -- packing a combination of equipment and services under a single price tag -- have on its market control, and what was IBM's intent in doing so?

- *Fighting Machines.* Again as in the CDC case, were low-profit or long-lead-time 360s and 2319s introduced to restrain competition by misleading potential users as to their availability and capability?

- *Educational Allowance.* Has IBM used discounts, equipment grants, or monetary grants awarded to various universities to increase its domination of any market?

- *Peripherals.* As unearthed in the Telex case, did IBM produce certain peripherals in a predatory manner designed to restrain competition, such as with the 2319 disk drives? Did the introduction of FTP and ETP leasing throttle competition?

- *Leasing.* Did IBM mount a campaign, as alleged in the Greyhound case, to stress the leasing of its equipment as opposed to the purchasing of it? And was that a campaign to raise competitive barriers by creating extreme capital requirements?

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IBM aloft

STORM CLOUDS BREW OVER IBM-COMSAT LAUNCH PAD: CARRIERS, FTC, JUSTICE DEPARTMENT, AND OTHERS OBJECT; AT&T SHRUGS

The FCC's interest in establishing competition to AT&T in communication systems is recognized. However, while the COMSAT/IBM joint venture may seem to offer viable competition with AT&T, this appearance may be illusory.

-- from FTC comments filed with the FCC, Sept.25, 1974

As such, AT&T does not oppose the proposed change in corporate ownership outlined by the joint petition.

-- from AT&T comments filed with the FCC, Sept.19, 1974

Judging from comments filed with the FCC, IBM's plan to junket into outer space via CML Satellite Corporation . . . announced in Washington last July as a sleepy Independence Day holiday began . . . has been received by the data transmission community with a bang, not with a whimper. To them, letting IBM into the specialized common carrier racket is tantamount to licensing the Giant to strip mine all those clouds with silver linings . . . the ones that make domestic satellite (DOMSAT) communications, including data transmission, so attractive to companies such as American Satellite, RCA Global, Western Union, and others.

If IBM's skeletal proposal to the FCC (EDP/IR, July 8,1974) with plans to acquire 55% of CML's stock from MCI and Lockheed can be considered a trial balloon . . . then such diverse entities as the FTC, the Justice Department, the Computer Industry Association, a host of specialized common carriers, and even the Public Broadcast System (concerned about the continuance of previous CML commitments) have flung their darts.

Some, like Sperry Rand -- the only mainframer filing objections with the FCC -- played it cool with avuncular recommendations that the FCC require more information from IBM and COMSAT, hold economic impact hearings, and set stringent controls on the joint venture if it is approved.

Others, like Datran -- which has visions of its $60 million investment in the digital transmission business being ground to powder by the two behemoths, IBM and AT&T, as they grope with massive outlays of capital for their toeholds in space -- simply squawked, loud and clear.

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Everyone, including presumably IBM, foresees the possibility -- nay, probability -- that IBM in an unfettered orbit would soon control the integrated information handling business from top to bottom. With its clutches on close to two-thirds of the entire computer market and with the current stampede toward teleprocessing and networking -- both of which have data communications as nervous systems -- IBM should have little trouble funneling business its way. That prospect of total system control -- from an IBM front end to an IBM ground station to an IBM satellite back to an IBM ground station and finally, after maybe a little value added along the way, to an IBM CPU -- is a little scary to many.

The major arguments for shackling IBM to Mother Earth are:

- An IBM alignment with COMSAT, the nation's most experienced satellite fielder, would quite likely end in monopoly. Each party could not only avail itself of the other's expertise; also, they would have considerable resources to take advantage of inside scoop about technological changes . . . such as those periodically wrought by IBM.

- The venture precludes either party from entering the domestic satellite field as a de novo participant . . . either alone or linked with a less formidable ally than an industry leader. To antitrust buffs, IBM and COMSAT make much better competitors than bedfellows.

- IBM's late entry into the DOMSAT fracas violates the spirit, and possibly the letter, of previous FCC hearings and decisions that presaged commencement of its "open skies" policy in 1972. The ticket window for communications star trekkers supposedly closed March 15, 1971.

- Last -- but definitely not least -- is the question of Ma Bell, and the fear that she and the Giant might not clash head-on in space as one might expect, but instead get on in a more amicable way . . . by splitting the heavens up the middle . . . or taking every other star.

Countdown to today

Lyndon Johnson was still President when Early Bird -- the world's first communications satellite (not just another member of the Presidential household) -- was launched from Cape Kennedy in the spring of 1965. As early as the next year, Western Union led the pack and petitioned the FCC for permission to both build and launch a private satellite for communications purposes.

But not until six years later, in 1972, did the FCC pry open the skies -- after announcing the year before a policy of multiple entry in the DOMSAT field that would hopefully foster competition and encourage cost-reducing innovations in satellite communications. (Deadline for prospective entrants to apply had been March 15, 1971.) Western Union was the first to get the Commission's go-ahead, others soon followed.

Crucial byproducts of the FCC's "emancipation proclamation" for the DOMSAT skies included both setting limits on AT&T and COMSAT participation in the field of satellite communications and limiting COMSAT's control over the nascent CML. These were all moves designed to help the new carriers face the difficult "start-up" period . . . when facing the awesome bulk of AT&T and the satellite savvy of COMSAT would prove the most disheartening to a striving newcomer. Specifically, the commission ruled:

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- COMSAT must choose between its existing plans to provide multipurpose DOMSAT services and an option to be a "carrier's carrier" for AT&T and others. Otherwise, revenues from AT&T alone would give it an unfair advantage over the other DOMSAT entrants.

- Any increase of COMSAT ownership of CML Corporation over a third would require commission approval. The other partners, MCI and Lockheed, would keep CML competitive with AT&T, a COMSAT customer.

- AT&T was authorized to lease COMSAT services for switched voice telephone services, but enjoined from providing private line services until three years after it commences domestic satellite services. The AT&T and GTE bird is scheduled to go up in 1976.

How big is the pie?

Indeed, according to analysts at International Data Corporation (IDC), publisher of EDP/IR, computer users will pay something like a billion dollars for data communication line charges this year. And these expenditures are expected to grow at the rate of 20% or more a year. Buttressing that trend is an increase in user outlay for data communications equipment, expected to hit $500 million this year and double again by 1976.

Since satellite transmission savings can run 50% or more of costs on coast-to-coast dedicated lines, more than a few companies have queued up at the launch pad awaiting the chance to ply that growing market from above.

RCA Global, for instance, has already pumped $40 million into its domestic satellite program, including $30 million for satellites alone. Western Union -- which became the first specialized common carrier to launch anything at all -- has invested a good $90 million in satellites, insurance, and ground facilities for its Westar system and launched a second satellite, Westar 2, earlier this month.

So that pie -- for which IBM is willing to pay MCI and Lockheed $3.2 million just to sniff -- is big. And investments in cutlery to slice it up have been substantial . . . which is what at once makes IBM such an awesome competitor and the stakes so high for those waiting to dine.

Triangular trade

It's hard to love a giant, and even harder to love two . . . especially ones as domineering as IBM and as intractable as AT&T. For many, the vision of the two titans slugging it out in the "ether" is a rich one. And, if that competition could be kept real and non-destructive, it might be good for the communications industry as a whole . . . antitrust considerations about IBM and the data processing industry aside.

But that's not the way it will work, according to some of the commentors to the FCC, noticeably the Justice Department, the FTC, Datran, and Sanders. Instead IBM and AT&T -- by virtue of their relationships with COMSAT and each other and some technological differences between their transmission fortes -- could simply become a space "duopoly."

The triangle is this. AT&T is COMSAT's biggest customer (over half of 1973 revenues of $119 million) and a substantial stockholder also (29% as of 1973).

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And with over half a billion dollars worth of IBM computers, Ma Bell is IBM's biggest customer. So, is it cynical to suppose that neither COMSAT nor IBM relishes the idea of locking horns with its greatest single source of revenue? And looking further ahead -- say to the late 1970s (by which time COMSAT-IBM satellites would be zooming around) -- the three-year restriction on AT&T's entrance into private line satellite services might be over. Thus, there is the possibility that the AT&T-COMSAT combo would be a competitor to IBM-COMSAT.

Only a die-hard optimist couldn't see the possibility of Ma Bell and IBM coming to a tacit agreement on market dibs. AT&T could stick to the monopoly trade and utilize its expertise in high grade voice circuits, while the Men from Armonk could concentrate on high-speed digital transmission.

From the gallery

Naturally, those filing comments with the FCC all looked at the problem from their own point of view. Hence Sperry was not too concerned, since the proposal doesn't immediately threaten its mainframe customer base and there will be time later to head IBM off at the pass should the situation degenerate. AT&T merely shrugged, stating that it saw nothing wrong with the proposal at this time as long as the FCC carefully reviews whatever plans are forthcoming from the restructured CML. Questions posed by the telephone monarch included how many more DOMSAT carriers should be allowed, and whether the commission -- if the IBM-COMSAT proposal is approved -- shouldn't discontinue the service limitations on AT&T's use of domestic satellites, and, ominously, whether IBM in the communications business might be grounds for AT&T to enter the data processing business.

The specialized common carriers were much more strident . . . and much more interesting. RCA Global pointed out that MCI and Lockheed would be getting paid about three times their current investment in CML and that neither has been inputting CML coffers since February. Datran referenced an alleged discussion between the Board Chairmen of IBM and AT&T reported in Business Week during the summer and asked the commission to ascertain "whether the above-referenced discussions entailed, explicitly or implicitly, substantially more than merely rap sessions between an equipment vendor and its customer. Were there to have been derived a 'Gentlemen's Agreement', whether express or tacit, respecting an appropriate division of markets between the two entities, the potential ramifications are so great that they defy evaluation at this time." Western Union mentioned the same Business Week article in a footnote.

Indeed, almost all of the IBM opponents managed to sling a little mud at the Giant for its past actions in the marketplace. Sanders conjured up the most vivid visions of the future . . . ones in which IBM pulled technological hocus-pocus -- with software, interface obfuscations, etc. -- to bewitch its user base into playing it safe with the master.

The Justice Department felt the FCC should either defer or deny the petition without prejudice. (Because of its pending case against IBM, DOJ limited its comments to the COMSAT-IBM-AT&T triangle, CML's unfair advantage in dealing with the world's most influential mainframer, and IBM's "waiting in the wings" effect on prospective DOMSAT carriers looking for capital and customers.) The FTC, however, wasn't shy about antitrust -- saying that IBM could "very well be the most significant and likely potential competitor of COMSAT." IBM, meanwhile, stated simply: "We are convinced that the proposed restructuring of CML Satellite Corp. will be in the public interest and no purpose will be saved by delay."

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SATELLITE WATCH

Major DOMSAT Proposals -- 1970 to 1974

Applicant	Filing Date	Satellites	Progress
Western Union	7/30/70 and 3/15/71	3	Westar 1, April 11, 1974; Westar 2, Oct. 10, 1974; Westar 3, spare
AT&T	10/19/70 and 3/3/71	3	Combined with GTE, launch planned 1976
RCA	3/11/71	3	Now leasing from Telesat (Canada), own launch planned 1975
American Satellite (Fairchild/Hiller)	3/11/71	2	Now leasing Westar circuits, own launch under study
Western TCI	3/15/71	2	Now leasing Westar circuits, developments expected soon
TelePromTer	3/15/71	-	Will lease only
COMSAT - MCI/Lockheed IBM/COMSAT General	3/1/71 - 3/8/71 7/3/74	3 - 2 ?	No launch dates had been specified, applications will be superseded by new plans
Hughes/GTE	1/4/71	2	Now combined with AT&T

(Note: Already sixteen communications satellites have been put into orbit from U.S. launch pads, including Early Bird, 12 Intelsat satellites, Canada's ANIK I and II, and the two Westars.)

A competitive atmosphere

The ball is in the FCC's court now, and comment from the commission isn't expected before its November 21 meeting. Meanwhile, because late filings were allowed for the FTC and Justice Department comments, IBM was granted an extension for rebuttal comments until October 17. When that rebuttal came -- from the legal grist mill of CML this time -- it was pretty much as expected. Stressing that the hybrid company would have the wallop to compete with AT&T and the expertise to bring technological advances to the marketplace, the response contended that no strings should be placed on the IBM-COMSAT union, or special conditions imposed. Denigrating objections raised about IBM's monopoly stance in the computer industry, CML added with a little pique, ". . . unless the commission wants to take over the courts, there is no need to try those issues here."

So now the FTC will have to decide. Is what's good for IBM also good for the two industries? Or if not, can the commission effectively limit the mainframer's involvement while still letting the acquisition go through? How much of the raft of objection offered is legitimate, how much simple griping?

It may be premature to say so, but EDP/IR wouldn't be surprised to see the FCC first think long and hard about the problem of keeping the skies open (meaning AT&T at bay) and about the option of tentatively approving the CML restructuring while calling for detailed plans from the company after the shuffle . . . and then refuse the petition.

The FCC, the FTC, and the Justice Department all work for the same government . . . which should mean something . . . and IBM did have a chance for DOMSAT consideration when the FCC conducted its lengthy proceedings prior to 1972. For the regulatory body that spent so much time and energy carefully structuring the fragile and delicate DOMSAT communications theater to let such a new and awesome player onto the stage -- or even in the wings -- seems unlikely.

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ICL BREAKS OUT ITS NEW PRODUCT LINE
UNVEILS TWO BIG COMPUTERS, CALLING THEM "VIRTUAL MACHINES"

When the flagging computer industry of England merged itself in defense against the cybernetic invasion from the Colonies, International Computers Limited was formed. This was back in 1968. Since then, the government-supported company has been content to enhance the vintage '64 product lines it inherited and calmly bide its time while two generations of computers flash by.

But tracing back through ICL's convoluted genealogy, one finds a branch of the family tree leading to ATLAS, a monstrous collection of wires and tubes surrounded by a house in residential London of 15 years ago -- and which history considers to be the first virtual storage computer.

Calling upon that heritage, ICL announced today two upper-end versions of a whole new product line of mainframes and called them "virtual machines." Equivalent in byte churning ability to the IBM 370/158 and 168 respectively, the ICL 2970 and 2980 are more than just an ocean apart from their IBM cousins . . . in developmental concept, architectural design, and, according to ICL, in their actual throughput capability.

"Yes, we did pump four hundred million into developing this product," said an ICL spokesman in New York. "And, now," he added with more than a little truth in his jocularity, "we have our fingers crossed."

The two systems, which are similar except for some memory and I/O muscle, are intended not just as upward extentions of the ICL 1900 and System 4 lines, but more, as developmental outgrowths of users' needs -- present and future -- and modularized stepping-stones to unforeseen technological changes.

Some pertinent aspects:

- Processing power is distributed throughout the system, providing for a minimum of data traffic congestion. For example, there are instruction code processors, memory access controllers, peripheral and communications controllers, etc. The hardware is a processing network designed to support its use as a "virtual machine."

- To the user, the system appears as he defines it -- making it different from simple timesharing -- and as if he were the only one using it. This is what makes it a "virtual machine." Not only do users share system machinery hermetically, but also software and data.

- The 2900 series has been designed to provide maximum upward compatibility from the older ICL products through the use of program source converters and system emulators. All the major 1900 and System 4 peripherals will run directly off the 1900s, and new peripherals have been made range independent.

Technical information from ICL is still sparse, but from the looks of it, about the only comparable U.S. machine would be the Burroughs B 1700, a virtual machine if there ever was one. Some differences exist, though, such as in data word size -- ICL uses the traditional byte, while Burroughs sets no limits thanks to a bit-addressable memory -- and in compatibility with other mainframe computers which is one of Burroughs' strong points.

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Not to mention plain old size. The 2980, for example, can sport up to 8 million bytes of semiconductor main memory (increased in increments of 256K from 1 million) with an access speed of 600ns and an access controller with up to 16 trunk links sprouting from it. Prices for the machines will start at near $2.3 million and go up from there (with lead-time currently about eight months).

Marketing, both overseas . . .

A question arises. How many 2900s will have to be sold for ICL and the British government -- which picked up a quarter of the check -- to recoup the $400 million research and development costs for today's fare . . . and up the company's perennially light return on sales ($400 million last year)? Plenty.

But at least the company has a head start. Introduced a year and a half ago the low end of the 2900 line, the 2903 small business computer, has been selling like hotcakes. According to the company, over 75% of a total 750 sold have gone to new users of ICL gear.

Perhaps even more significant is where those 2903s are coming to rest. Almost two-thirds have been sold overseas, marking ICL's biggest emigration from the Sceptered Isle. Also, 40% of 2903 sales supposedly have gone to bump competitive products. If ICL comes close to that track record with the rest of the product line, then competition in the European arena should heat even further up from its current fever, as ICL, Unidata, and the U.S. contingent wrestle for the market.

. . . and in the U.S?

These are tough times to unleash a new top-heavy computer line upon a capital-hungry market, but, following a management shake-up two years ago, ICL's marketing team took on a new lean and hungry look. With the 2903 making such substantial inroads into the foreign markets, the American sector may look just fat and juicy enough to bring that ICL team across the Atlantic. They're keeping quiet, but a few weather vanes in the wind are these:

- The 2900 system currently has emulation capabilities for earlier ICL products. If the microprogramming and hardware design is anything like the Burroughs virtual machine, then it's more than likely that emulators could be devised for U.S. type product lines also.

- ICL switched to an 8 bit data word size (instruction words variable up to 32 bits). Conforming to this previously-ignored convention might be significant when it comes to providing inter-manufacturer system compatibility.

- The company has scheduled a November 19 press conference in New York to discuss marketing plans. The grapevine information is that these will center on the 2903, and possibly be the kick-off address for the U.S. campaign.

So, braving IBM, Honeywell, and others, the current worldwide economic doldrums, and maybe even a little noonday sun, ICL could very well be planning to bring its wares over . . . easing in with the small unobtrusive end of the line and following up later with the heavyweight end. And even if it doesn't, the U.S. mainframers now enjoying reasonably heady success overseas may find themselves having to maintain a stiffer upper lip before long.

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• BURROUGHS TAKES ON SAMSON, which is what the Canadian government calls the national defense message processing web (Strategic Automated Message Switching Operational Network) it hopes to weave together over the next decade. The fat $24 million contract -- which Burroughs thinks might be one of the largest ever placed north of the border -- went to its Canadian subsidiary, Burroughs Business Machines, Ltd. Three major message switching centers and a fourth support facility will employ dual B 2700s or 3700s (upgradable as required) and B 774 communications processors to handle message traffic, security, and control. Other nodes in the system will also fall under Burroughs purview. First installations in 1976.

• NEW TELEPHONE COMPUTING SERVICE OR DEJA VU? Telephone Computing Service of Seattle says it has "Pay-by-Phone" systems now operating in several banks, meaning bank customers can now pay bills over the phone. Either code numbers punched on a touch-tone phone or a call to customer service on a dial phone can initiate the automatic transactions.

The company offered this service -- as well as a few others more esoteric -- once before, but marketed it directly to consumers, who, it turned out, viewed with distaste such intimate dealings with a computer. From the ashes of that venture sprung this one, with the difference that now the banks act as the marketing conduits, and, as the company president says, "computers are not crammed down customers' throats." As for the banks, they should be happy, too. So far all of them are savings types, and customers just might view the service as an alternative to the standard checking account.

• HONEYWELL'S SERIES 60 LEVEL 61 COMES HOME TO ROOST. The two smallest models of Honeywell's Series 60, the 61/58 and the 61/60, first showcased in Europe last May, are now available for stateside users. The 61/58, which starts at $1400 per month leased, will be available this quarter. It comes with 5K or 10K bytes of main memory, 16K to 65K of extended store memory, and 7K ROM. The 61/60 starts at $2900 a month and has 10K main memory, the same extended memory option, and 10K ROM. The two entry-level systems are designed to compete with such systems as the IBM System/3 and Singer's System 10 and provide upgrade capabilities to Honeywell Series 58 users. Both come with Level 61 GCOS and integrated peripheral controls.

• AN ADD-ON HIERARCHICAL MAIN MEMORY (HMM) FROM ITEL will supposedly give 370/145 users looking for vastly increased memory capacity a break. Using a fast bipolar 7K cache memory and slower 512K blocks of modular secondary memory, the HMM can utilize the VS operating system and hardware and remain transparent to programmers while eliminating the overhead associated with paging. The secondary memory may be slower, but at half the price of the native stuff, Itel thinks it offers users a deal. Lead-off HMMs will be stepping up to bat early in 1975 and starting at $142K.

• AND USING THAT SAME WORD, IBM has announced a new control program, available free of charge to users who purchase or rent appropriate control units or adapters ($875 or $130 a month respectively), that enables a host computer and sensor-based satellite processors to operate in a responsive "hierarchical" network. Called the Distributed Intelligence System (DIS), it has processors in a network acting as one by combining sensor-based IBM System/7s with a host 370/135 (and up). Each of up to 64 of the System/7s gets a control adapter, while the major system controller attaches to the host 370. Under DIS, applications at the host can be triggered by the satellites and data from any of the processors can be transferred to any application program. As the Telex documents inferred, IBM felt it needed a few things to get its System/7s going full blast . . . and DIS, may be one of them.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" NOVEMBER 6, 1974 • VOL.10,NO.4 P.J.McGOVERN,PUBLISHER

Minicomputer fall roundup

MINI SHIPMENTS TO TOP $1 BILLION THIS YEAR WHILE NEW PRODUCTS HERALD A SHIFT TOWARD THE END USER

As autumn daubs its final touches onto 1974 . . . and economic councils buzz and bicker in Washington . . . it seems that at least one segment of the beleaguered U.S. business world will be whistling "It Was a Very Good Year" as winter descends and 1975 lurches into view: the minicomputer industry.

For the makers of the small computers, 1974 has been a good year indeed, with the last two months especially effervescent. In spite of the worldwide economic malaise that looks more and more like a recession or worse, most of the major manufacturers posted record sales and earnings through October, and all look optimistically toward the new year . . . each hoping to continue at or above an expected industry growth of 25-30%. And even with a slight dip in OEM accounts -- more of a genuflection than a dip, anyway, as buyers readjust inventories and dig in for the uncertain days ahead -- minicomputer sales should rush well past the $1 billion mark for the first time, up 50% from last year.

Meanwhile, during the year, most of the major manufacturers announced new products or major enhancements to old ones . . . redefining their product lines and in the process easing ever closer to the end user.

As for the black (or blue, green, yellow, red, etc.) boxes themselves, some 50,000 of which will have pelted the world market during 1974, EDP/IR finds trends beginning to crystallize behind the developing growth pattern:

- The micro/mini/macro boundaries are springing leaks. At the upper end minis are beginning to nip at traditional general-purpose computers, especially when two or more are used in concert. (System prices for these can run up to almost $200,000). At the lower end, minis and micros are mixing it up . . . and together exploring new applications.

- While machine performance steps up and costs drop, more and more manufacturers are seeing the wisdom of providing more sophisticated software and miniperipherals of their own design and production. Value added thus offsets hardware price cuts in the systems realm, while the barebones renditions slip into lower price brackets -- free, then, to probe new markets and deal with microprocessor rivalry.

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- More and more minis are landing into nets -- or at least coming with networking talents. These include increased functions for communications, better mass storage, and, in some cases, a modular progression to system upgrading. Here, the top of the line would be a multiple of the bottom with appropriate operating software enhancements, I/O capabilities, and even such advanced applications as data base management . . . rather than just a bigger, beefier CPU.

In terms of dollars, this wooing of end users, including those overseas where OEM expertise is more scarce, will prove more significant as time goes on. For instance, according to a recent study by International Data Corporation, publisher of EDP/IR, this year's total minicomputer shipments are divvied on an OEM to end user ratio of 2:1 by number -- but just the reverse by dollar. And IDC sees that gulf diverging over the years.

Technology update

The fast-paced, ever-changing lifestyles in Miniland couldn't be better illustrated than with a recap of developments over just the last month. DEC, IBM, Data General, Computer Automation, General Automation, ModComp, and Hewlett Packard -- or over two-thirds of the industry by numbers and dollars of shipments last year -- all had major announcements for the public. Chronologically:

October 1, Data General . . .

. . . introduced its "Eclipse" S/200 and S/100 user-oriented computers with fast bipolar cache memory, error detection routines, flexible memory allocation, and harware interrupt features among others. Compatible with existing DG computers, both models handle upper-level software such as Fortran V, Basic, and Algol. The two models represent an upward extension of the DG product line, with the S/200 capable of supporting up to 256K bytes of main memory, twice the maximum available from DG's previous slugger, the Nova 840. A total system price for an "Eclipse" configuration might well run over $150,000. Later announcements from DG include a new 740K bit moving-head disk subsystem and a software package of commercial subroutines, neither of which is confined to the new "Eclipse."

October 4, IBM . . .

. . . announced its Distributed Intelligence System (DIS) -- the control program (and hardware controllers) intended to crank the System/7 up to full bore as a satellite within an IBM VS 370 sensor-based system. Plaintiff's Exhibit #85 in the Telex case hinted that the System/7 -- IBM's lone entry in the mini race -- was meant for use as nerve ending within a bigger IBM system and that stand-alone capabilities were actually windfall byproducts. DIS appears to be the final kick toward that goal. With it the satellite can interrupt the host and activate control programs remote from it, as well as interact with other satellites. Thus, as EDP/IR will examine in a later issue, IBM remains aloof from the mainstream of minicomputer activity . . . at least for a while.

October 15, DEC . . .

. . . informed its PDP-11 users that a COBOL compiler was now available, extending PDP-11 use into the business systems area. A week earlier, DEC

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had lowered prices on the low-end OEM PDP-11/05, and, in tandem, the actions signaled movement in two directions at once along the OEM/end user line. At the company's annual stockholders' meeting at month's end, DEC's president, Ken Olsen, confirmed that wary move by admitting that his company will soon unveil two more PDP-11s, one big, one small. Recent collaboration between DEC and Western Digital hints that the low-end mini will actually be a three-chip microprocessor.

October 16, General Automation . . .

. . . a company which its president, Ray Noorda, describes as "lean, mean, hard, and hungry," announced a new small business- and industrial-oriented computer family built around its SPC-16 processor. The new system, dubbed DM-100, slips into the product line just below the System 18/30, now called the DM-200. Each DM-100 comes with an array of peripherals, OS software, and applications software to choose from. What GAI, long a suitor of the end user (OEM business accounts for only about one-third of its sales), feels is unique about its new family is that each model is a subset of the next larger. "For example," says GAI's marketing director, "an IBM System/3 satellite processor can communicate with an IBM 370, but it can never become an IBM 370."

October 28, ModComp . . .

. . . of Fort Lauderdale reached another plateau in its byte-on-a-board progression by announcing a 32K single-board memory -- one of which is cheaper to make than two of its 16K boards -- making for price reductions of 12% to 27% on its current minis. Concurrently, a new operating system, MAXNET III was announced. It supposedly enables a user to hook two or more ModComp II computers into a distributed processing network. Satellites can utilize peripherals attached to the host; and the size of the system can be increased by adding computers -- with no software changes involved.

October 30, Computer Automation . . .

. . . released a new disk operating system (DOS), not earthshaking in itself, but significant considering CAI's miniscule end user trade. Echoing rumbles heard in the semiconductor industry, sales of the Naked Mini dropped off enough last quarter for CAI to post an earnings decline and cut its workforce . . . a result, to some extent, of OEMers pruning inventories of the low-priced, easy-to-overstock machines. Although CAI's president, D.H.Methvin, denies any pell-mell exodus from the OEM trenches, DOS is CAI's first step into the minicomputer systems field. Most of the hardware and all of the software is CAI's.

October 31, Hewlett Packard . . .

. . . bumped its biggest product offering, the nettlesome HP 3000, with four new HP 3000 CXs, designed for distributed network use and aimed primarily at the end user. One operating system serves all models; spooling, virtual memory, and communications subroutines come with it. Models can also stand alone. One company spokesman felt the announcement was of major importance because it meant that HP was betting on distributed processing as "the force of the future."

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An industry checkup . . .

October, then, was a hectic month . . . and not just for the minicomputer industry. While mini builders were jockeying their debutants to business cotillions here and abroad, Wall Street was having spasms and the economy began to look as though it were gearing morosely for a siege.

Under those conditions, a simple "how's business?" becomes more than mere rhetoric, and when EDP/IR sampled the mini makers' opinions on the economy and the state of business, the answers were thoughtful. They were also optimistic -- even after proper garnishing with salt -- with certain recurring themes:

- A minicomputer is the type of product that might actually thrive in a belt-tightening environment -- where businesses look to automation as a method of cutting costs. If not disaster-proof, the industry could at least be recession-resistant.

- OEM business has tailed off a bit (as CAI's earnings slip and DEC's price cuts on the PDP-11/05 bear witness), but primarily at the lower end of the scale -- where OEM buying habits could most closely mirror those in the semiconductor world -- and as a result of inventory adjustments instead of real demand slippage. CAI, for instance, plans no drastic marketing changes for the Naked Mini and expects business to pick up once the slack is out of the supply chain.

- The industry is better prepared for hard times. Compared to 1970-71, when the minicomputer industry last saw the boom lowered, companies are more mature, product lines more diverse, customer bases more spread, and management more weathered. The marketplace is now used to the sight of minis . . . and considers them more than frills.

- Overseas markets appear to be holding up despite ominous thunder in the ambient economy, mostly as a result of rising labor costs and increasing familiarity with the product. And OEM business is a smaller portion of overseas trade than it is domestically.

. . . and the bill of health

The industry is coming of age. Over the last six years, the value of annual minicomputer shipments has increased almost sevenfold. It would be nice -- in an industry that doesn't pollute the air, rape the land, or devour energy -- for that growth to continue. But as industries mature, growth gets less spectacular . . . as it gets more solid. Today, most industry savants, including DEC's Olsen, Data General's marketing staff, IDC, and others, see next year's growth hitting roughly 30%, and tapering to 20% three years from then. That means $2.7 to $3 billion (over twice this year's sum) will be shipped in 1978!

Although forecasting beyond an industry's lead time can be tricky, and technological change can render previous statements "inoperative," EDP/IR expects the industry to remain exciting and viable for years to come. Of course it's possible that the industry is merely lagging the general economic slump, but at least one insider (from Digital Computer Controls) registers the economic downturn in this way: "If I just closed my eyes and stayed inside this building, I wouldn't know anything about it." Others may be less brash, but at least they're looking to the future with cautious smiles -- and not grimaces.

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DEDICATED APPLICATION DIGITAL COMPUTER CENSUS

The data below was compiled from the best information available to International Data Corporation; questions or comments should be directed to Walter Misdom, the Census Editor. Dedicated Application (Group B) computers are those commonly referred to as minicomputers, plus certain larger systems designed primarily for a single application such as process control, data communications, and data entry. Group B computers -- though general purpose by design -- are typically word oriented (8, 12, 12, or 24 bits per word), usually sold outright, and predominantly programmed in machine language. Exceptions in all these do occur, however.

Indeed, definition is becoming increasingly difficult, and subjective judgment is necessary. For example, office accounting computers (called "visual record computers" in Europe) such as Burroughs' E and L Series or TC-500, the Litton/ABS 1200 series, NCR's 399, Nixdorf's 820, and Singer's 5800 are excluded; among those included, however, are "data entry" oriented machines such as the Eldorado 140, Four Phase, and MAI's Basic Four; they compete with other "minis," yet do not fit EDP/IR's definition of General Purpose (Group A) computers.

AS OF JULY 1, 1974

NAME OF MANUFACTURER	COMPUTER MODEL	NOTES	BITS PER WORD	PRICE CLASS	PURCHASE PRICE ($1,000) BASIC	PURCHASE PRICE ($1,000) AVERAGE	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Adage, Inc.	AGT-10 Series						4/68	32	3	35	X
	AGT-100 Series			4	100	165	1/72	17	13	30	2
	300			2	30	37	3/74	2	0	2	NA
	400			2	30	37	3/74	2	-	2	NA
Apeco (Cascade)	80/20	*	8	2	28	35	1/70	]	]	]	]
	80/30	*	8	2	31	40	1/70	] 215	] 10	] 225	] X
	80/40	*	16	3	46	57	1/70	]	]	]	]
Autonetics	Recomp-II		40	4	95	127	11/68	30	5	35	X
	Recomp-III		40	3	65	94	6/61	7	2	9	X
Bailey Meter	750		25	4	40	110	6/60	37	15	52	X
	755		25	4	80	130	11/61	7	2	9	X
	756		25	4	90	150	2/65	17	12	29	X
	855/15		16	4	24	135	12/72	8	1	9	NA
	855/25		25	4	100	400	4/68	16	0	16	X
	855/50			4	100	400	3/72	24	0	24	NA
Bendix	BDX-6200		20	3	25	60	5/70	40 +	0	40 +	NA
	BDX-9000		16	1	6	15	/71	8 +	0	8 +	NA
Bunker Ramo	130		15	3		90	10/61	160	27	187	X
	133		15	4		108	5/64	79	9	88	X
	230		15	4		134	8/63	15	2	17	X
	300		29	4		275	3/59	18	5	23	X
	330		29	4		275	12/60	19	7	26	X
	340		29	4		375	12/63	19	3	22	X
	1018		18	1		23	12/71	NA	NA	NA	NA
Cincinnati Milacron	CIP-2000 Series	a	8	1	4	12	7/69	540	0	540	NA
Clary Data Comp.	404	*	16	2	6	30	1/70	100 +	20	120 +	NA
Collins Radio	8311			1	15	17	1/68	NA	NA	NA	NA
	8400			4		950	11/62	25	8	33	X
	8500		32	4	200	1,000	1/67	53	16	69	X
Compiler Systems Inc.	CSI-16		16	1	11	20	11/70	80 +	0	80 +	NA
	CSI-24		24	2	15	30	12/70	30 +	0	30 +	NA
Computer Automation Inc.	108/208/808		8	1	5	11	4/68	280	30	310	X
	116		16	1	8	16	8/70	115	15	130	NA
	216		16	1	8	20	7/69	350	45	395	X
	816		16	1	10	15	12/68	40	5	45	X
	Alpha-8		8	1	3	4	5/72	]			
	Alpha-16		16	1	4	9	10/71	] 1,230	185	1,415	NA
	Naked Mini-8		8	1	2	3	5/72	]			
	Naked Mini-16		16	1	3	7	10/71	] 930	140	1,070	NA
	Alpha-LSI		16	1	2		12/73	]			
	Other							1,190	245	1,435	NA
	Totals							4,135	665	4,800	NA
Computer Development	CD-2000		8	1	7	10	8/70	NA	0	NA	NA
Computer Logic Systems	CLS-18		18	1	9	14	3/71	NA	0	NA	NA
Computer Signal Processors	CSP-30		16	4	85	120	6/70	10 +	0	10 +	0
Comtec	CT/90		16	3	50	85	1/72	NA	0	NA	NA
Comten, Inc.	10			1		17	7/69	70 +	0	70 +	NA
	20		16+2	3		80	3/71	90 +	0	90 +	NA
	40		32+4	4	125	240	8/69	30 +	0	30 +	NA
	60		32+4	4	150	365	9/69	20 +	0	20 +	NA
Consultronics (Sc. Control Corp.)	600 Series		24	3	31	80	10/65	230	0	230	X
	4700		16	3	15	72	4/69	18	0	18	X
	DCT-132		8	2	28	36	5/69	75	65	140	X
Control Data Corp.	160		12	4	60	112	5/60	49	11	60	X
	160-A		12	4	90	225	7/61	200	65	265	X
	160-G		13	4		535	3/64	34	1	35	X
	924/A		26	4		430	8/61	26	1	27	X
	1700		16+2	4	37	160	3/66	290	180	470	X
	1700-SC		16+2	3	20	60	9/70	150	130	280	X
	System 17		16+2	2	14	39	2/74	25	5	30	NA
	8090		12	3		90	5/64	116	89	205	X
	8092		8	3		67	6/64	56	14	70	X
	G15		29	3		61	7/55	265	30	295	X
	LGP-21		32	2		42	12/62	140	35	175	X
	LGP-30		32	3	49	59	8/56	290	43	333	X
	RPC-4000		32	4	87	101	10/60	61	12	73	X
	CSC-46/136/636		15	4		280	/54	27	3	30	X
	Elbit-100		12	1	6	8	6/67	5	445	450	X
	M-1000		24	4	250	365	/68	22	0	22	NA
	Totals							1,756	1,064	2,820	NA
Datacraft Corp.	6024-1		24	4	51	135	5/69	20	0	20	X
	6024-3		24	3	32	90	2/70	119	26	145	6
	6024-4		24	3	24	100	8/73	24	3	27	10
	6024-5		24	2	16	50	5/72	147	2	149	7

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Data General Corp.	Nova		16	1	6	13	2/69	740	610	1,350	Neg
	Nova-800		16	1	7	17	3/71	960	190	1,150	180
	Nova-820		16	1	6	16	4/72	480	90	570	135
	Nova-840		16	2	16	30	7/73	185	35	220	120 +
	Nova-1200		16	1	5	10	12/70	3,000	660	3,660	560
	Nova-1210/1220		16	1	4	10	2/72	2,365	630	2,995	500
	Nova-1230		16	1	7	11	12/71	205	50	255	55 +
	Supernova		16	1	9	21	4/70	175	75	250	Neg
	Supernova-SC		16	2	17	30	6/71	155	85	240	40
	Nova-2/4		16	1	3	7	10/73	240	60	300	250
	Nova-2/10		16	1	4	8	10/73	180	45	225	175 +
	Eclipse-S/100		16		9		2/75	-	-	-	NA
	Eclipse-S/200		16		16		2/75	-	-	-	NA
	Totals							8,685	2,530	11,215	2,015 +
Datamate Computer Systems	DM-16		16	2	17	26	11/69	12	0	12	X
	DM-70		16	1	9	15	12/70	25 +	0	25 +	NA
	DM-70/ROM		16	1	4	6	10/70	NA	0	NA	NA
	ECP-18		18	1	14	15	11/66	21	0	21	X
	2400		24+3	1	15			NA	0	NA	NA
Data Technology	1600		8	1	6	22	9/68	NA	0	NA	NA
Digiac Corp.	3060			1	9	13	1/70	86 +	0	86 +	NA
	3080		25	1	20	25	12/64	16	0	16	X
	3080-C		25	2	26	37	10/67	8	2	10	X
	3090			1	5		2/74	4	0	4	NA
Digital Computer Controls	D-112		12	1	3	12	8/70	850	95	945	]
	D-116		16	1	3	12	2/72	2,030	225	2,255	] 750
Digital Equip. Corp.	PDP-1		18	4	120	136	11/60	35	6	41	X
	PDP-4		18	3		74	8/62	30	3	33	X
	PDP-5		12	2	30	36	9/63	61	29	90	X
	PDP-7		18	3		66	11/64	69	46	115	X
	PDP-8, i, l, s		12	2	8	27	5/65	5,750	3,675	9,425	X
	PDP-8/e, f, m		12	1	4	12	4/71	9,950	5,000	14,950	2,400
	PDP-8/Linc		12	2	38	48	9/66	88	46	134	X
	PDP-9 & 9L		18	2	35	50	12/66	290	160	450	X
	PDP-11-05 & 10		16	1	3/7	12	2/72	3,500	2,250	5,750	1,250
	PDP-15 & 20		16	1	3/11	16	3/70	2,710	1,460	4,170	500
	PDP-35 & 40		16	2	9/13	30	1/73	1,735	690	2,425	800
	PDP-45 & 50		16	3	24/32	80	4/72	1,010	365	1,375	325
	PDP-12		12	2	13	45	4/69	500	245	745	Neg
	PDP-15		18	3	15	75	2/70	430	225	655	50
	Totals							26,158	14,200	40,358	5,325
Digital Scientific Corp.	Meta-4		16	3	29	100	4/70	75 +	0	75 +	NA
Dynamic Research	DPC-44		24	2		36	7/68	NA	0	NA	NA
Eldorado	140/200	*	8	2	18	30	1/70	335	0	335	50
Electronic Associates Inc.	640		16	3	27	55	6/67	110	61	171	X
	1020		16	1	20	25	2/64	100	25	125	X
	8400		32	4	200	450	6/65	21	8	29	X
	Pacer-100		16	2	15	40	5/72	85	70	155	45
Electronic Processors Inc.	EPI-118		18	1	3	14	11/70	NA	0	NA	NA
	EPI-218		18	1	4	14	1/72	NA	0	NA	NA
EMR	210		12	4	94	132	4/62	9	0	9	X
	420		42	4	324	450	6/63	3	0	3	X
	2100		21	4	65	143	12/63	8	0	8	X
Foto Mem, Inc.	Centauer-100		8	1	6	20	4/70	20 +	0	20 +	NA
Four Phase Systems	IV/40		24	3	16	55	6/73	200	0	200	100
	IV/70	*	24	3	16	60	3/71	590	0	590	100
Foxboro	Fox-1		24	4	95	260	10/72	NA	NA	NA	NA
	2/10		16	2	30	50	11/72	NA	NA	NA	NA
	2/20		16	3	50	100	9/72	NA	NA	NA	NA
General Automation Inc.	GA-18/30		16	2	18	50	7/69	450	80	530	Neg
	SPC-12		8	1	4	16	1/68	2,525	375	2,900	200
	SPC-16		16	1	8	25	5/70	2,770	415	3,185	390
	Totals							5,745	870	6,615	590
GE/PAC	30	b	8	1	7	35	5/69	200	35	235	NA
	312		20	4		200	3/60	27	6	33	X
	412		20	4		300	7/62	39	8	47	X
	3010	c	16	3	13	90	5/70	25	1	26	X
	3010/2	d	16	4	15	140	12/71	NA	NA	NA	NA
	4010		24	4	76	200	10/70	30	4	34 +	NA
	4020		24	4	79	250	2/67	200	60	260	X
	4040		24	4		120	8/64	45	20	65	X
	4050		24	4		280	12/66	23	3	26	X
	4060		24	4		340	6/65	18	6	24	X
	4070		24	4	300	1,000		NA	NA	NA	NA
	4401		24	4		235	9/74	-	-	-	NA
	4402		24	4		500		-	-	-	NA
	Totals							607	143	750	NA
GRI Computer	909 Series		16	1	4	9	1/70	330	65	395	50
	99/30		16	1	5	15	6/72	360	45	405	105
	99/40		16	1	6	17	6/72	90	10	100	25
GT&E (Tempo)	I		16	2	14	36	12/69	90	10	100 +	NA
	II		16	1	6	10	1/72	50	0	50 +	NA
	IS/7000		16	1	8	13	2/72	NA	NA	NA	NA
Hewlett Packard	2000-A'	f	16	4	89	101	11/68	165	55	220	X
	2000-B	g	16	4	119	134	8/70	35	15	50	X
	2000-C		16	4	197	205	3/71	220	10	230	Neg
	2000-E		16+1	3	50	75	7/72	55	30	85	Neg
	2000-F		16	4	110	137	7/72	105	10	115	Neg
	2007-A	h	16	2	20	40	9/68	10	10	20	X
	2100-A		16	1	7	15	6/71	3,985	2,340	6,325	1,100
	2100-S		16	2	16	35	8/73	500	270	770	470
	2114-A		16	1	10	16	5/68	450	310	760	X
	2114-B		16	1	9	15	10/68	265	185	450	X
	2115-A		16	2	15	26	11/67	240	100	340	X
	2116-A		16	2	22	32	11/66	265	200	465	X
	2116-B		16	2	24	40	8/68	450	255	705	X
	2116-C		16	2	20	45	11/69	180	95	275	X
	2123-A		16	1		21	2/74	40	10	50	NA
	3000		16	4	100	185	11/72	40	10	50	20
	Totals	i						7,005	3,905	10,910	1,590
Honeywell	19		19	4		140	5/61	3	0	3	X
	21		20	3		63	2/66	41	25	66	X
	24		24	4		200	5/63	82	3	85	X
	112		12	1	5	10	11/69	222	48	270	X
	116		16	3		65	4/68	172	35	207	X
	124		24	4	65	130	3/66	109	18	127	X
	224		24	4	75	380	3/65	55	8	63	X
	290		18	4		175	11/60	10	2	12	X
	316		16	2	8	45	6/69	1,450	565	2,015	Neg
	324		24	4	175	250	7/68	12	0	12	X
	416		16	2	17	43	4/67	198	130	328	X
	516		16	3	24	95	10/66	865	285	1,150	X
	632		32	4	97	450	12/68	10	4	14	X
	700 Series		16	3	16	53	6/72	945	265	1,210	300
	164X Series	j	16	4	144	440	12/69	20	8	28	X
	Totals							4,194	1,396	5,590	300 +
IBM	1710/1720		6	4		225	2/62	8	10	18	X
	1800		16+2	4	47	235	2/66	550	380	930	X
	System/7		16	3	17	60	11/71	2,570	630	3,200	1,000
	Totals							3,128	1,020	4,148	1,000
Imlac	PDS-1	*	16	1	10	11	2/70	NA	0	NA	NA
Information Technology Inc.	4900/5		8	1	3	5	10/70	NA	0	NA	NA
	4900/10		16	1	10	20	10/65	25	0	25	X
	4900/20		12/32	2	30	50	10/69	20 +	0	20 +	X
Infotronics	Mini/Maxi		16	1		25	7/70	NA	0	NA	NA

* primarily sold as "small business computer" and/or "intelligent terminal/data entry"
a. cross-licensed version of Microdata-800
b. cross-licensed version of Interdata-1
c. cross-licensed version of Interdata-4
d. cross-licensed version of Interdata-70
e. including Microdata-1600
f. utilizes 2116-B
g. utilizes 2114-B or 2116-B
h. utilizes 2115-A or B (Educ. Basic Systems)
i. excluding 2000 and 2007 "system" configurations avoid double counting
j. utilizes two H-316's
k. cross-licensed, ruggedized version of DG/Nova
l. Manufactured by Photon, Inc.
m. utilizes Xerox - Sigma 2
n. utilizes CAI-116

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Interdata	1		8	1	4	11	9/70	235	85	320	X
	2		16	1	11	14	7/68	20	0	20	X
	3		16	1	13	20	5/67	200	5	205	X
	4		16	1	9	21	8/68	300	125	425	X
	5		16	1	11	25	11/70	80	20	100	X
	15		16	2	22	35	9/69	40	24	64	X
	16/18		16	2	15	30	8/71	3	13	16	X
	50		16+1	1	7	19	4/72	70	20	90	20
	55		16+1	2	16	40	8/72	55	15	70	20
	70		16	3	9	65	12/71	625	165	790	165 -
	74		16	2	3	34	2/73	135	35	170	65
	80		16	2	15	44	7/72	35	10	45	15
	85		16	3	23	60	7/73	15	3	18	15
	7/16		16	2	3	35	2/74	80	25	105	155 +
	7/32		32	3	10	73	7/74	-	-	-	NA
	Totals							1,893	545	2,438	455 +
Interplex	System-1		16	2		47	9/70	NA	0	NA	NA
Keane Associates Inc.	System/4			3		65	11/71	150	0	150 +	NA
Linolex	Model A	*	8	2	10	30	8/72	75	0	75 +	NA
Lockheed	MAC-16		16	1	11	22	3/69	315	35	350	X
Electronics	MAC-Jr		16	1	8	16	1/71	1,155	205	1,360	160 -
	Sue-IIIX		16	1	6	10	9/72	415	45	460	130
MAI	Basic Four	*,e	8	3	25	46	8/71	550	450	1,000	300
Memorex	MRX-40	*	16	4	91	180	8/72	18	18	36	X
	MRX-50	*	16	4	104	250	8/72	8	12	20	X
Microdata Corp.	400		8	1	3	4	1/70	140	0	140	15
	800		8	1	5	8	6/69	630	150	780	Neg
	810		8	1	6	10	5/69	435	135	570	Neg
	812		8	1	11	15	12/69	330	100	430	Neg
	820		8	1	6	13	10/70	1,320	705	2,025	270
	1600 Series		8	1	5	11	2/72	1,595	300	1,895	400
	3200		16	1	5	10	10/73	70	10	80	100
	3230		16	1	8	16	10/73	50	10	60	75
	32/S		16	1	10	20	3/74	20	0	20	40
	Totals							4,590	1,410	6,000	900 +
Mini Comp	Administrator-2		16	3	35	52	12/70	NA	0	NA	NA
	MD-708		8	1	5	7	8/70	50	0	50 +	NA
	Multi User-E		16	3	67	85	11/70	NA	0	NA	NA
	Multi User-I		16	3	40	58	1/71	NA	0	NA	NA
Modular Computer Systems	Modcomp-I		16	1	2	9	10/71	455	0	455	85
	Modcomp-II		16	1	4	22	3/71	260	0	260	40
	Modcomp-III		16	2	13	44	12/70	83	0	83	12
	Modcomp-IV		16/32	3	19	89	5/74	10	0	10	NA
	Totals							808	0	808	137
Monroe	XI	*	32	2	21	28	5/60	250	200	450	X
Motorola Comm. Div.	MDP-1000		8	1	8	19	2/69	75	0	75 +	X
	MC-6800		8	1	5			NA	0	NA	NA
Nanodata	QM-1		18	4	75	150	/73	NA	0	NA	NA
Nuclear Data Inc.	ND-812		12	1	7	15	3/71	515	10	525	NA
Omnicomp Computer Corp.	Omnus-1		16	1	8	12	8/71	NA	0	NA	NA
Omnitec (BIT)	480		8	1	6	17	12/66	195	3	198	X
	483		8	2	9	33	1/70	115 +	40	155 +	NA
Philips	P-850 Series	*	16	1	3	15	4/71	155	NA	155 +	NA
Prime	100		16	1	4	6	4/73	68	42	110	NA
	200		16	1	6	18	11/72	32	20	52	NA
	300		16	3	12	63	9/73	20	10	30	NA
Qantel Corp.	Quantel-V	*	8	2	14	30	6/70	350	0	350	200
	Answer	*	8	2	12	27	5/72	200	0	200	NA
Raytheon Data Systems	703		16	1	13	23	10/67	179	33	212	X
	704		16	1	10	18	3/70	500	150	650	75
	706		16	2	19	30	5/69	75	17	92	X
	PB-250		22	2	33	48	12/60	115	20	135	X
	PB-440		24	4		140	3/64	20	2	22	X
	PB-520		24	4		128	10/65	26	1	27	X
	RDS-500		16	1	8	14	12/73	NA	NA	NA	NA
	Totals							915	223	1,138	NA
Redcor Corp.	RC-70		16+2	2	15	30	7/68	125	15	140	X
Rolm Corp.	1601	k	16	2	13	28	3/70	515	105	620	NA
	1602	k	16	2	18	26	2/73	175	0	175	NA
Sanders	Series-200		16+2	4	57	120	3/69	NA	NA	NA	X
	Series-800		16				12/71	NA	NA	NA	NA
	MIP-16		16	2	15	30		NA	NA	NA	NA
Spear	Microlinc		12	3	46	57	6/66	33	3	36	X
Spiras Systems/USM	65		16	2	19	40	8/69	25	2	27 +	X
Sys. Computer Corp.	500		8				6/72	NA	0	NA	NA
	1000		8	1	4		1/71	600	0	600	NA
	1500		8				6/72	NA	0	NA	NA
Systems Eng. Labs	810		16	2	38	45	9/65	24	6	30	X
	810-A		16	3	18	90	4/67	236	10	246	X
	810-B		18	4	30	150	12/68	168	10	178	X
	840		24	3	65	80	11/65	3	0	3	X
	840-A		24	3	60	75	8/66	36	4	40	X
	840-MP		24	4	49	260	12/67	33	0	33	X
	71		16	2	13	48	8/72	315	100	415	NA
	72		16	2	20	45	8/70	37	12	49	NA
	85		32	4	150	240	7/72	20	3	23	NA
	86		32	4	200	325	6/70	46	5	51	NA
	88		32	4	350	600	3/71	5	1	6	NA
	Totals							923	151	1,074	NA
Tenet	210		32	4	200	385	8/71	NA	0	NA	NA
Texas Instruments	960		16	2	14	30	6/70	400 +	0	400 +	X
	960-A		16	1	3		11/71	725	0	725	NA
	980		16	2	17	40	5/68	300 +	0	300 +	X
	980-A		16	1	4		5/72	140	0	140	NA
	Totals							1,565	0	1,565	NA
Unicom, Inc.	CP-8A		8	1	3		2/70	122	18	140	NA
	CP-8B		8	1	3		3/70	87	13	100	NA
	CP-8C		8	1	5		3/70	158	24	182	NA
	CP-8D		8	1	7		4/70	23	3	26	NA
Unicomp, Inc.	Comp-16		16	2	11	29	6/70	26	0	26	X
	Comp-18		18	2	12	38	8/70	38	0	38	X
Univac (EMR)	6130/6135		16+2	4	85	200	3/66	60	38	98	X
	6140/6145		16	4	60	120	6/72	NA	NA	NA	NA
	6020		24	4	72	175	4/65	13	3	16	X
	6040		24	4	98	225	7/65	9	1	10	X
	6050		24	4	123	360	2/66	17	6	23	X
	6070		24	4	240	600	10/65	1	3	4	X
Varian	520/i		16	1	6	13	9/68	350	150	500	X
	620/a		16	3		75	12/65	135	15	150	X
	620/f		17+1	1	11	25	6/70	210	40	250	X
	620/f-100		16	1	10	22	6/72	225	45	270	NA
	620/i		16+2	1	10	20	12/65	1,220	80	1,300	X
	620/L & 100c		16	1	5	12	2/71	665	185	850	NA
	620/L-100		16	1	6	14	6/72	545	130	675	NA
	R-620 & 622/i		16+2	2	15	29	6/69	180	20	200	X
	V-72				10		2/74	55	4	59	NA
	V-73						11/72	145	25	170	145
	V-74			3	40		5/74	1	0	1	NA
	Totals							3,731	694	4,425	NA
Varisystems	PAC-16	1	16	1	4		9/69	20	0	20 +	X
Wang Labs	3300 Basic		8	2	14	40	4/71	80	0	80 +	NA
Westinghouse	P-50		14	1	16	23	8/64	203	19	222	X
	P-250	m	16	3	40	62	9/67	58	10	68	X
	P-500 Series		18	4	85	110	6/63	39	6	45	X
	P-2000		16	2	10	27	8/69	157	44	201 +	NA
	2500		16	2	10	30	11/71	135	20	155 +	NA
	Totals							592	99	691	NA
Xerox	92		12	3		90	4/65	40	10	50	X
	910		24	4		120	8/62	170	10	180	X
	920		24	4		150	9/62	110	20	130	X
	925		24	4		200	12/64	10	4	14	X
	930		24	4	80	400	6/64	100	25	125	X
	CF-16 & A		16	1	8	23	6/69	40	5	45	X
	CF-16 & A	n	16	1	8	17	11/70	93	7	100	Neg
	Sigma-2		16	4	24	125	12/66	210	40	250	X
	Sigma-3		16	4	28	140	1/70	228	85	310	NA
	Totals							998	206	1,204	NA
XLO	Eight		8	1	4		1/71	50 +	0	50 +	NA
TOTALS								92,342	31,317	123,659	

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• JOINING THE RANKS OF IBM POT-SHOTTERS is Memory Technology Inc., an add-on memory builder from Wayland, Mass., which filed antitrust charges against IBM in Boston's U.S. District Court yesterday. MTI's gripes read like those that have surfaced in other suits against the Giant and refer specifically to IBM practices of linking a minimum main memory to its CPUs, lowering prices on its own memory (raising system prices to cover), and deliberately designing the 370/155 with a short life-span. Damages asked are $56 million trebled -- or about 10 times the company's claimed annual revenue. Asked about the danger of an IBM countersuit, MTI's president, John J. Marino, felt there was little and noted that no MTI personnel had ever worked for IBM. The antitrust suit comes a year after a major management shakeup at MTI and shift in marketing toward OEM business -- in which, the complaint alleges, IBM's monopoly made it difficult for the PCM to compete, grow, and find financing.

• WITHIN THE CLOISTERED HALLS OF EUROPE'S OLDEST UNIVERSITY, a super-scale CDC CYBER 76 will soon be whirring. And so will a smaller CYBER 72. The two computers will join a CDC 6600 already in operation at the University of Bologna, founded in the thirteenth century, and provide the muscle for a data processing network that will eventually encompass up to 100 terminals connecting Bologna with Milan, Rome, Trieste, and other cities. The University is currently the hub of a system involving 12 universities and technical institutes, plus a growing number of businesses and industries. The "on" button will be hit next January.

• LASHING OUT AT "REGULATED COMPETITION" -- meaning MCI and all those others nipping away at Ma Bell's monopoly in communications -- was the AT&T Chairman, John D. deButts. Speaking before a friendly audience of the Telephone Pioneers of America (an organization of 20-year employees), he lamented "it is regulated competition that, asserting its intent to provide the 'slumbering' Bell System with the spur of competition, precludes us from competing back." Later at the Oct.22 meeting in Houston, he berated case by case regulatory decisions -- ones that don't examine the whole picture -- with this gloomy scenario: "The American people may one day discover that the foundation stones on which the nation's telecommunications service have been built have been swept away one by one and no prospect remains of restoring them." Dear Mother.

• MORE MINI-NEWS OF NOTE: Eldorado's 140/200 computer will soon have a new sponsor, Anderson Jacobsen,Inc. (AJI) of California. AJI and Eldorado have agreed to AJI's adoption of Eldorado's computer systems subsidiary. Purchase price was not disclosed, and final terms have to be worked out.

COMTEN, has just introduced a new communications processor entitled the COMTEN 3650 and designed to compete with the IBM 3704 and 3705 in the lower price range of communications controllers and remote processors. Monthly lease rates start at $900. A networking system, based on the new 3650, some comprehensive control programs, and older COMTEN products was also announced.

• NESTLED SNUGLY IN THE FINE PRINT -- in a footnote to be exact -- of IBM's slickly printed reply to the FCC concerning its entrance into DOMSAT skies via CML, was this gem: "IBM intends to apply to the Commission within a few months for construction permits to erect two or three transmit-receive earth stations at different IBM locations within the United States to further explore and develop techniques and equipment . . . for IBM's internal voice and data communications between the locations involved." Hmmmm.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" NOVEMBER 20 • VOL.10,NO.5 P.J.McGOVERN,PUBLISHER

System/7 goes "mainline"

VIRTUAL STORAGE 370s AND SENSOR-BASED SYSTEM/7s WED AS IBM PUTS ONE MORE SYSTEM Q BRICK INTO PLACE WITH "DIS"

> . . . The fourth phase provides fully integrated support. That is, priority interrupt and the other sensor-based features have been integrated into the CPU . . . [and that] fully integrated support provides two modes of operation. First, the 18XX [System/7] can control the experiment (control the feature modules) and cause a priority interrupt on the host or on an as-needed basis . . . . Second, the CPU can control the 18XX [System/7] feature modules directly . . . .
>
> -- from Telex trial documents dated October 1970

> The magic of it is that it's tranparent, really a sensor-based 370. That guy at the console of the System/7 is seeing a 370 for all he knows. And the 370 can see each of the 7s.
>
> -- IBM spokesman, November 1974

Even though a copyright scuffle prevents official use of the "DIS" acronym, IBM's recently announced Distributed Intelligence System for coupling System/7s to virtual storage host 370s is an enhancement that seems to be an enhancement that can extend the market for both systems . . . and, even more, to serve as yet another landmark along that shortening promenade between now, System Q, and FS.

Announced first as a stand-alone process control computer in October, 1970, the sensor-based System/7 -- considered in many circles to be a minicomputer despite IBM's careful avoidance of the word -- has long seemed out of place in any role. For one thing, the fast 16-bit processor with 2K to 65K words of main memory seemed priced too high. For another, while hardware, software, and droves of peripherals deluged other stand-alone minis, the System/7 didn't seem to get its fair share of attention, much less the amount that would be expected from IBM.

For sure, a disk operating system added in 1971 gave users some much-needed mass storage; hook-up to 360s and 370s as an I/O device was provided for the next year; and teleprocessing capabilities were improved the year after that. (Also, memory additions, software compilers, and canned application programs were tossed in along the way.) But -- compared to the turbulent minicomputer world -- System/7's product line growth was sparse. More than anything else, the attention paid to System/7 seemed a concession to marketing etiquette, a marking of time.

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But there was method behind IBM's madness in keeping System/7 out of the mainstream of mini fashion, and it was this: From the beginning, the Giant has viewed the diminutive System/7 not so much as a serious contender in the fast-track minicomputer derby . . . *but as a necessary adjunct -- much like a sense organ for the brain -- to the 370 product line . . . increasing in importance as that product line continues its carefully cadenced march from one "Advanced Function" to the next via System Q toward Future Systems.*

Inductive reasoning on the part of EDP/IR? No, not really. Behind that insight into the IBM corporate subconscious loom the "Telex" documents. Aging and skeletal they are; nevertheless they are fascinating in hindsight. In foresight, they provide a focal point for peering ahead.

For example, this issue's opening quote comes from what IBM entitled "Forecast Assumptions -- SCAN Advanced Functions," a confidential roadmap to the 370 journey through the early 1970s . . . and in those SCAN papers, sensor-base computing is revealed as a function destined for the 370 systems -- with the System/7 only one link in an evolutionary chain.

The parchment lens

The introduction of DIS signals a change in the "gravitational attraction" between satellite System/7s and host 370s and interpreting it requires some background. In this case, the SCAN memo makes a good lens for examining the future . . . as it appeared five years ago to those in the IBM universe. Other documents unearthed by Telex corroborate the SCAN forecast.

Within the SCAN document -- which became Telex Exhibit #85 -- three major evolutionary changes were foreseen for the 370 product line. Called "Advanced Functions," they were:

- "Multiprocessing" -- which, for the 370 world (the 360/65 has had multiprocessing capabilities for years), became a reality in February of 1973 with the announcement of OS/VS2 Release 2 and the 370/158 and 168 MP versions. (A SCAN forecast dated 10/30/70 called for announcement in mid-1971 with first customer shipment in early 1973.)

- "Relocate" -- which, otherwise known as virtual storage, received the IBM sanction in August of 1972 with the announcment of the 370/158 and 370/168 and DAT conversions for the 370/145 and 370/135. (The same SCAN forecast was only a year off this time.)

- "Sensor Base" -- which, starting with the 1970 debut of the System/7 as a stand-alone process control computer, would be introduced in three phases ending with the full interactive hook-up of System/7s to 370s . . . and supported by appropriate operating system and hardware enhancements at the 370 end. (Less than one year off forecast.)

Also mentioned were other 370 midlife enhancements that weren't considered advanced functions as such, but which included various operating system changes, peripheral development, and increases in main memory size. Of special importance is the fact that all three of the "Advanced Functions" were to be compatible with System Q, and at least one, virtual storage, required for it. Multiprocessing would be supported in varying configurations and numbers of units, and sensor-based processing would be a standard capability on FS machines.

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Looking back at the future

The sensor-based strategy outlined in the Telex documents -- including executive committee meeting minutes and quarterly product assessments as well as the SCAN literature -- boiled down to: "Go Main Line." That is, once the System/7 hit the streets, IBM's energy would mainly be spent fleshing out the interface between it and its host . . . and, in fact, the major stumbling blocks to real-time sensor-based processing lay within the 370 and not the System/7.

So, according to the "Go Main Line" plan, while the 370 advanced function was heating in the crucible, an advanced phalanx of System/7s would penetrate the sensor-based market as best they could in their stand-alone configurations and, by infiltrating the factories and labs of industry and science, pave the way for 370s to come. There were three phases to that plan:

- Initial announcement of the System/7 with teleprocessing capabilities via normal data communications channels. Here, a host system would "see" a System/7 as a 2740 Communications Terminal.

- Adding the capability to attach a System/7 to a host CPU through a selector and/or a block multiplexer channel, thus giving the satellite the status of a directly linked I/O peripheral device.

- Introduction of a "Priority Interrupt" and "Basic Channel Adapter" at the host along with concurrent support in operating system software. The result would be real-time responsiveness to sensor-based applications . . . and an interactive distributed network.

The first two phases of the plan appear to have been executed. When the curtain opened on the System/7 it was a stand-alone processor with run-of-the-mill teleprocessing abilities. Data transfer and interactive dealings with the host CPU and other satellites were limited and dependent on user-written software. There was, however, an option for a direct link through the use of DSP (Distributed System Programs) to two other small IBM computers, the general purpose 1130 and the data acquisition and control 1800.

Then in 1972 the second step was taken when DSP were announced for direct connections between System/7s and IBM 360s or 370s. But from then on, satellite enhancements concerned themselves with keeping abreast of IBM advancements in communications (1973's announcement of a bisynchronous communication option, for example) or with keeping at least a little competitive in the stand-alone marketplace with software releases (such as with Automated Program Generation and a growing library of standard applications programs.)

The question now is whether or not IBM just tiptoed into phase three of the "Go Main Line" game plan, and if so, what does it signify?

DIS distilled

According to IBM, the Distributed Intelligence System is the "highest level interactive hierarchical system yet" for tying host 370s and satellite System/7s together into a distributed processing net, enabling them supposedly to act more or less as one big sensor-based processor. The DIS release itself is a no-cost control program for the system and its accompanying hardware -- which does cost and which has been available RPQ for some time. The specifics:

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- Each host 370 -- which must be a 135 through 168 operating under OS/VS1 -- must have a sensor-based control unit, to which as many as 64 System/7s may be attached. Control units cost $35,000 or rent for $875 a month. Up to four may be attached to any one CPU.

- Each satellite System/7 must have a sensor-based control adapter that connects via coaxial cable to the CPU's control unit up to a mile away. Data transfer rate is 277,000 bytes per second, and price for the control adapter is $5,200 purchase, or $130 a month rental.

- System/7 programs can be stored at the host and dumped to the front-end when needed. Satellites can activate applications at the host or another System/7, and share data and system resources with the 370 and the other satellites. In addition, the host CPU acts as a traffic manager and performs higher level processing.

- Each of the System/7s on a net is assigned a priority -- specified by the user -- that determines its importance to the host. One satellite cannot interrupt the 370 when it is processing another satellite's job, and once the CPU finishes a job it calls on the highest priority satellite that then wants attention.

Phase three . . . or two-and-a-half?

The two major 370 features spotlighted by the Telex documents as necessary for full-fledged sensor-based computing -- phase three -- were the "priority interrupt" and the "basic channel adapter." Neither was particularly well defined in terms of design, but functions of each were described. The SCAN memo says:

> . . . Priority Interrupt (PI) -- permits the external stimuli (sensors) to interrupt the CPU, in a customer-selected priority sequence, in order to give "immediate" attention to a real-time task.
>
> . . . since the BCA allows direct addressing of the sensor I/O devices, the software will support device allocation at the sensor I/O point level. Thus, separate application programs using different sensor I/O points in a single 18XX [System/7] could be run as separate jobs for integrity.

Clearly, DIS doesn't provide a true priority interrupt. On the other hand, it seems amazingly close to the SCAN plan . . . providing a "customer-selected priority sequence." So this may well satisfy user needs. Satellites are more often than not used for one particular dedicated application -- environmental control or security, for example -- and most priorities will fall logically into an order. Also, since the longest possible interaction between a System/7 and the host 370 is a full memory dump (which takes less than 0.3 seconds), DIS provides real-time responsiveness to at least a certain degree.

And as far as the basic channel adapter is concerned . . . things may not be exactly the way IBM envisioned them five years ago, but the function is covered. The transparency provided under DIS takes care of this.

Therefore . . . considering the five years that have passed since the concepts were first developed, IBM seems to have demonstrated a tremendous amount of foresight (or else the entire organization is polarized around a mania for following a plan). That the triple-decker plan for the sensor-based Advanced Function

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BROWSING THROUGH IBM

Even though out of context, the quotes below taken from various and sundry documents unearthed by Telex's pretrial discovery illustrate the flavors of food -- or at least hors d'oeuvres -- for thought within. EDP/IR has limited this spin through the archives to comments relating to sensor-base computing.

* * *

" . . . The Data Processing Division is dedicated to a successful Sensor-Based Marketing Plan which embodies the concept of "Go Main Line . . .

" . . . The March 1969 Sensor-Based Potential Study estimated 40 to 60% of the 1975 Market Estimate could be realized by IBM if a complete sensor-based strategy were implemented . . .

" . . . Utley reviewed the announcement specifics and the anticipated enhancements over the period '71 -- '73. He stated that initially the MINI-DACS [System/7] will be essentially a stand-alone computer with some teleprocessing capability. . . .

" . . . The following assumptions also apply to Large Systems sensor-based support: a) The sensor-based features will also be provided in FS systems, b) No manufacturing constraints are to be assumed, c) The sensor-based features can coexist with MP in the relocate machine. The sensor-based feature will be field installable . . .

" . . . [The object is to] provide systems with the capability to support sensor-base hardware facilities. This support, together with AOS programming and the S/7 Direct Sensor Input Module (DSIM), will permit operation in an on-line real-time environment . . .

" . . . [Risks lie in the fact that] multiprocessing and sensor-base architecture [is] not completely firm . . .

" . . . When compared with competitive systems, the System/7 is purchase price non-competitive . . .

" . . . The S/7, when evaluated overall in the light of competition, must be judged deficient. The S/7 is an evolving product in an evolving marketplace and timeliness may be the significant factor . . .

" . . . Follow-on sensor-based capability will continue into the FS time frame."

has been met is virtually proved by IBM's withdrawal of support for the DSP options that link System/7s to 370s and 360s. This was done quietly and not mentioned in the DIS announcement.

What does it mean? It re-emphasizes that one of the primary purposes of the System/7 is to sell 370s and general-purpose equipment. (An IBM spokesman indicated that if a lot of S/7s were connected to a single 370, the host CPU would tend to become dedicated to the task.) Indeed, IBM has never indicated it wanted into the mini scramble. And, it clears away the last of the major 370-related projects disclosed in the Telex documents. That could mean Q for next year and some FS deliveries by 1976. It's in the plan.

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GENERAL PURPOSE COMPUTER CENSUS

Counts in the General Purpose Digital Computer (Group A) Census, shown below, are based on the best information available to the International Data Corporation, but are estimates. Computer manufacturers, as a rule, do not directly supply this type of information, and it is only through the use of IDC's extensive data files and other information sources that such estimates are possible. The computers included in Group A comprise the bulk of digital computers (by value) in operation. They are byte or character oriented -- with the exception of large-scale scientific machines -- and are primarily programmed with higher-level languages. In addition to this Census, EDP/IR publishes a Dedicated Application Digital Computer (Group B) Census that includes minicomputers and specialized-purpose machines.

AS OF OCTOBER 1, 1974

NAME OF MANUFACTURER	COMPUTER MODEL	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Burroughs	B-200 Series	$ 5,600	11/61	90	69	159	X
	B-300 Series	$ 5,200	7/65	345	70	415	X
	B-500	$ 6,000	11/69	448	435	883	X
	B-705/711	$ 1,300	3/73	200	110	310	150
	B-1712	$ 1,950	8/72	200	90	290	120
	B-1714	$ 2,200	8/72	310	175	485	180
	B-1726	$ 5,300	2/73	215	55	270	120
	B-1728	$ 7,700	8/73	65	28	93	70
	B-2500	$ 8,200	2/67	208	122	330	X
	B-2700	$ 8,700	8/72	140	93	233	75
	B-3500	$ 14,700	5/67	590	330	920	X
	B-3700	$ 20,000	11/72	64	25	89	48
	B-4700	$ 27,000	10/71	148	103	251	75
	B-4790	$ 41,000	11/75	-	-	-	NA
	B-5500	$ 35,000	3/63	85	30	115	X
	B-5700	$ 29,500	12/70	22	7	29	6
	B-65/6700	$ 50,000	11/69	77	62	139	12
	B-7700	$120,000	8/73	9	3	12	9
	Subtotals			3,216	1,807	5,023	865
CDC	G-20	$ 19,600	4/61	3	5	8	X
	1604/A/B	$ 42,000	1/60	17	4	21	X
	31/3150	$ 9,000	12/64	85	49	134	X
	3170	$ 17,500	12/70	13	15	28	X
	3200	$ 14,700	5/64	47	44	91	X
	3300	$ 28,800	9/65	117	90	207	X
	3400	$ 23,700	11/64	4	8	12	X
	3500	$ 26,000	1/69	10	17	27	X
	3600	$ 48,000	6/63	18	12	33	X
	3800	$ 53,000	12/65	19	3	22	X
	6200	$ 42,600	11/70	2	6	8	X
	Cyber-72	$ 48,400	10/71	23	39	62	9
	Cyber-172	$ 41,200	1/75	-	-	-	NA
	6400	$ 59,600	5/66	57	49	106	X
	Cyber-73	$ 52,100	3/72	9	32	41	7
	Cyber-173	$ 54,600	1/75	-	-	-	NA
	6500	$ 78,800	12/67	20	15	32	X
	6600	$105,300	8/64	60	30	90	X
	Cyber-74	$ 93,000	3/72	3	6	9	3
	Cyber-174	$ 67,500	1/75	-	-	-	NA
	Cyber-175	$ 84,000	1/75	-	-	-	NA
	6700	$107,000	7/70	3	0	3	X
	7600	$125,000	1/69	13	6	19	X
	Cyber-76	$125,000	3/72	2	3	5	2
	Star-100	$250,000	12/73	1	0	1	3
	Subtotals			526	433	959	24
Digital Equipment Corp.	PDP-6	$ 10,000	10/64	16	8	24	X
	1040/1050	$ 13,300	10/67	177	71	248	17
	1055	$ 22,000	12/71	26	10	36	9
	1070-1077	$ 30,000	6/72	18	2	20	5
	Subtotals			237	91	328	31
HIS	Gamma 10	$ 2,500	7/64	0	985	985	X
	Gamma-30	$ 9,900	2/62	0	146	146	X
	G-5X Series	$ 1,550	1/66	670	3,050	3,720	150
	G-100 Series	$ 4,000	4/66	253	1,490	1,743	X
	G-200 Series	$ 13,700	4/61	183	53	236	X
	G-405/410	$ 9,000	2/68	18	8	26	X
	G-415/420	$ 14,000	5/64	128	187	315	X
	G-425/430	$ 17,000	6/64	35	99	134	X
	G-435/440	$ 22,000	9/65	93	48	141	X
	G-615	$ 55,000	6/69	4	22	26	X
	G-625	$ 65,000	4/65	2	3	5	X
	G-635	$ 80,000	5/65	43	18	61	X
	G-645	$120,000	7/66	2	1	3	X
	G-6025	$ 21,800	11/73	28	10	38	34
	G-6030/40	$ 33,000	6/71	86	114	200	26
	G-6050/60	$ 46,500	7/71	66	49	115	23
	G-6070/80	$ 61,500	7/71	33	14	47	10
	G-6180	$100,000	2/74	3	0	3	3
	G-Subtotals			1,647	6,297	7,944	246
	H-105	$ 2,500	11/71	600	145	745	100
	H-110	$ 2,600	9/68	140	170	310	X
	H-115	$ 5,300	3/70	860	390	1,250	80
	H-120	$ 4,600	1/66	340	160	500	X
	H-125	$ 7,900	12/67	70	295	365	X
	H-200	$ 6,400	3/64	435	215	650	X
	H-2020	$ 2,350	2/73	400	45	445	100
	H-2030	$ 5,050	1/73	70	11	81	18
	H-2040	$ 9,000	4/72	325	115	440	70
	H-1015	$ 12,500	4/71	115	63	178	13
	H-2050	$ 14,100	4/72	195	60	255	35
	H-12/1250	$ 12,000	2/66	295	152	447	X
	H-2015	$ 17,800	2/71	120	60	180	15
	H-2060	$ 18,500	4/72	86	17	103	15
	H-2200	$ 19,600	1/66	119	46	165	X
	H-2070	$ 23,000	5/72	59	9	68	10
	H-3200	$ 26,900	2/70	62	28	90	X
	H-4200	$ 31,000	9/68	27	5	32	X
	H-2088	$ 44,000	4/72	5	1	6	2
	H-8200	$ 73,000	2/69	22	4	26	X
	H-4/1400	$ 13,200	12/61	24	24	48	X
	H-800	$ 28,500	12/60	33	11	44	X
	H-1800	$ 46,000	7/64	7	4	11	X
	H-61/58	$ 1,950	1/75	-	-	-	NA
	H-61/60	$ 3,300	1/75	-	-	-	NA
	H-62/40	$ 3,800	1/75	-	-	-	NA
	H-62/60	$ 4,300	1/75	-	-	-	NA
	H-64/20	$ 7,400	1/75	-	-	-	NA
	H-64/40	$ 12,700	1/75	-	-	-	NA
	H-66/20	$ 23,300	1/75	-	-	-	NA
	H-66/40	$ 36,200	1/75	-	-	-	NA
	H-66/60	$ 48,800	1/75	-	-	-	NA
	H-66/80	$ 90,000	1/75	-	-	-	NA
	H-68/80	$100,000	1/75	-	-	-	NA
	H-Subtotals			4,409	2,030	6,439	458
	HIS-Totals			6,056	8,327	14,383	704

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AS OF OCTOBER 1, 1974

NAME OF MANUFACTURER	COMPUTER MODEL	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
IBM	System 3/6	$ 1,700	12/70	3,000	1,760	4,760	700
	System 3/8	$ 1,850	6/75	-	-	-	NA
	System 3/10	$ 2,480	1/70	15,975	7,175	23,150	2,500
	System 3/15	$ 4,550	3/74	650	90	740	1,400
	360/20	$ 3,600	12/65	2,800	4,550	7,350	X
	360/22	$ 5,800	7/71	870	310	1,180	X
	370/115	$ 6,750	4/74	600	400	1,000	1,600
	360/25	$ 7,500	10/68	555	1,050	1,605	X
	370/125	$ 10,100	6/73	1,600	900	2,500	1,200
	360/30	$ 11,000	6/65	2,760	2,230	4,990	X
	370/135	$ 16,225	5/72	2,600	1,400	4,000	1,100
	360/44	$ 14,300	7/66	61	80	141	X
	360/40	$ 19,600	5/65	1,310	1,550	2,860	X
	370/145	$ 27,800	7/71	1,895	975	2,870	650
	360/50	$ 32,500	8/65	605	510	1,115	X
	370/155	$ 53,350	2/71	800	510	1,310	X
	370/158	$ 61,200	5/73	495	165	660	610
	360/65	$ 74,000	11/65	440	210	650	X
	370/165	$ 95,000	6/71	155	75	230	X
	370/168	$110,200	7/73	145	35	180	150
	360/67	$112,000	6/66	39	14	53	X
	360/75	$ 94,000	1/66	32	15	47	X
	360/85	$141,000	10/69	5	4	9	X
	360/9X	$150,000	11/67	14	2	16	X
	370/195	$194,600	3/71	20	4	24	7
	1130	$ 2,300	2/66	2,540	1,825	4,365	X
	1401	$ 3,700	9/60	950	865	1,815	X
	1401-G	$ 2,300	5/64	75	30	105	X
	1401-H	$ 1,300	6/67	35	41	76	X
	1410	$ 17,000	11/61	91	54	145	X
	1440	$ 4,700	4/63	195	200	395	X
	1460	$ 9,800	10/63	52	37	89	X
	1620	$ 2,700	9/60	305	225	530	X
	7010	$ 26,000	10/63	13	7	20	X
	7030	$160,000	5/61	3	1	4	X
	704	$ 32,000	12/55	1	1	2	X
	7040	$ 25,000	6/63	9	15	24	X
	7044	$ 36,500	6/63	8	10	18	X
	705	$ 38,000	1/56	3	3	6	X
	7070-74	$ 27,000	3/60	97	35	132	X
	7080	$ 60,000	8/61	47	1	48	X
	7090-94	$ 70,500	8/60	66	10	76	X
	Subtotals			41,916	27,374	69,290	9,917
NCR	Century-50	$ 1,950	2/71	1,125	200	1,325	195
	Century-100	$ 2,980	9/68	900	900	1,800	X
	Century-101	$ 2,750	10/72	800	90	890	215
	Century-151	$ 3,500	2/75	-	-	-	NA
	Century-200	$ 7,900	9/69	700	385	1,085	40
	Century-201	$ 7,000	8/74	10	-	10	NA
	Century-251	$ 10,000	11/73	65	25	90	75
	Century-300	$ 20,000	2/72	36	22	58	14
	304	$ 10,000	1/60	5	0	5	X
	310	$ 1,000	5/61	13	10	23	X
	315	$ 5,000	5/62	318	263	581	X
	315-RMC	$ 11,800	9/65	54	44	98	X
	390	$ 800	5/61	242	153	395	X
	500	$ 1,100	10/65	730	1,490	2,220	X
	Subtotals			4,998	3,582	8,580	539
Philco	1000	$ 7,000	6/63	15	1	16	X
	210/211	$ 40,000	10/58	9	1	10	X
	212	$ 52,000	1/63	8	1	9	X
Singer	System 10	$ 2,500	10/70	1,080	775	1,855	300
Standard Computer Corp.	IC-4000	$ 9,000	9/68	4	0	4	X
	IC-6000	$ 16,000	5/67	3	0	3	X
	IC-7000	$ 17,000	6/69	7	0	7	X
Univac	I/II	$ 25,000	3/51	3	2	5	X
	III	$ 25,400	8/62	31	36	67	X
	SS-80/90	$ 8,000	8/58	15	19	34	X
	418-I/II	$ 13,700	6/63	71	64	135	X
	418-III	$ 18,600	7/69	45	56	101	8
	491/492	$ 27,000	12/61	16	12	28	X
	494	$ 47,000	2/66	53	45	98	X
	1004	$ 1,000	2/63	885	880	1,765	X
	1005	$ 1,630	4/66	640	200	840	X
	1050	$ 8,800	9/63	164	140	304	X
	1103/5	$ 35,000	12/50	0	3	3	X
	1106	$ 41,000	12/69	85	122	207	23
	1107	$ 57,000	10/62	6	13	19	X
	1108	$ 68,000	9/65	135	100	235	X
	1110	$ 79,000	6/72	22	32	54	16
	9200	$ 2,700	6/67	1,215	895	2,110	X
	9300	$ 4,600	9/67	905	875	1,780	X
	9400	$ 11,500	5/69	280	305	585	45
	9700	$ 21,600	8/72	11	17	28	X
	90/30	$ 8,200	2/75	-	-	-	NA
	90/60	$ 17,900	1/74	45	15	60	55
	90/70	$ 24,900	11/73	17	5	22	34
	Subtotals			4,644	3,836	8,480	181
	301	$ 6,600	10/60	142	7	149	X
	501	$ 16,100	6/59	8	0	8	X
	3301	$ 22,700	7/64	64	0	64	X
	Spectra 70/15	$ 4,000	9/65	11	0	11	X
	Spectra 70/25	$ 7,000	9/65	2	2	4	X
	Spectra 70/35	$ 11,800	1/67	88	5	93	X
	Spectra 70/45	$ 22,600	11/65	242	18	260	X
	Spectra 70/46	$ 37,400	11/68	30	2	32	X
	Spectra 70/55	$ 34,900	11/68	5	2	7	X
	Spectra 70/60	$ 40,500	9/70	18	0	18	X
	Spectra 70/61	$ 47,200	3/71	10	0	10	X
	Spectra 1600	$ 3,600	1/69	67	0	67	X
	Spectra 70/2	$ 11,500	7/71	108	0	108	X
	Spectra 70/3	$ 18,900	10/71	19	0	19	X
	Spectra 70/6	$ 29,300	10/71	45	0	45	X
	Spectra 70/7	$ 36,300	10/71	22	0	22	X
	Subtotals			881	36	917	0
	Totals			5,525	3,872	9,397	181
Xerox	Sigma-5	$ 11,500	8/67	265	60	325	X
	Sigma-6	$ 20,000	11/70	40	8	48	5
	Sigma-7	$ 24,000	12/66	100	25	125	X
	Sigma-8	$ 19,000	9/71	23	8	31	4
	Sigma-9	$ 44,000	11/71	42	8	50	7
	530	$ 3,500	8/73	175	35	210	90
	550	$ 7,525	11/74	-	-	-	NA
	560	$ 17,030	11/74	-	-	-	NA
	940	$ 24,000	4/66	57	5	62	X
	9300	$ 8,500	11/64	30	5	35	X
	Subtotals			732	154	886	106 +
TOTALS				64,332	46,418	110,750	12,667

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• SLIPPING A SLOWER MEMORY INTO THE NOVA 840 and calling it a Nova 830, the number two mini maker, Data General, announced a new computer last week. With a slower cycle time, the 16K byte-per-board core memories -- also on the parts list for the Nova 2 minis -- DG can now offer almost the same processing power of the Nova 840 . . . for less. A typical Nova 830 with 128K bytes of main memory, power supply, chassis, and memory management feature costs $23,150 . . . and one 830 can handle up to 256K bytes of main memory. So Data General will now begin phasing out the 840 in favor of the smaller 830 and the bigger "Eclipse" models.

• GETTING INTO THE SPIRIT OF DETENTE, Sycor has announced that it will soon be producing Model 340 Cyrillic keyboard terminals for use in the Soviet Union. All I/O data transfer will conform to Russian RIAD code standards, while the keyboard and display will have a bilingual option for English and Russian use. Sycor now produces terminals for use with ten different national languages.

• JAPANESE COMPUTERS ARE SOON TO HAVE A BRITISH ACCENT, or at least British software, for Hitachi of Japan has just concluded a deal with Management Systems and Programming Ltd. of the U.K. to market the English firm's Module Testing System (MTS) to users of the HITAC 8000 Series of computers. The Britishers describe their MTS as a "comprehensive framework for the development of structured software and modular programs," and count 108 users in 13 countries. MTS can be donned by IBM 360s and 370s, ICL 1900s and System 4s, and Univac 1100s. Perhaps more significant than what the company said was "tens of thousands of pounds" that Hitachi will pay is the fact that the company is purchasing software at all, and from a British company at that.

And with dollars ($4 million) instead of pounds, the Japanese mainframer made another deal -- this time with the U.S.'s Uppster Corporation and for hardware instead of software -- to obtain the mechanical portions of Uppster's Model II computer printer, which incorporates a high-speed xerographic process. The OEM shipments should begin next spring.

• BUT SEE WHAT A GOOD MOTHER I AM? is the essence of a recent AT&T filing with the FCC in which Ma Bell announced intentions to "continue to explore new ways to permit customers to connect their 'answer only' communications devices to the telephone network." Claiming that adequate protection for service, equipment, and personnel has always been the reason for Bell's strident objection to interconnection with outside devices, the company mentioned some recent examples of that policy shift, but failed to note that the thaw came as the result of heat generated by complaints to the FCC.

• AND IN CASE THE SERVICE ISN'T ALL THAT GOOD ANYWAY, L.K. Comstock & Co. has come up with a computerized system for remotely locating and diagnosing foul-ups on phone networks. Where private exchanges mingle with the Bell net, the mini-based trouble-shooter can determine which side of the interface the trouble is on . . . and which repairman gets the overtime.

• WATCH OUT FOR FALLING STOCKS, Honeywell and General Electric warned each other when they changed the cross-option provisions governing the acquisition by Honeywell of General Electric's 18.5% interest in Honeywell Information Systems (HIS). Terms of the cross-option now depend on when it's exercised and not, as before, on a complicated formula involving stock prices. So the deal is no longer subject to gyrations of Wall Street . . . just time. The GE package -- pegged at 1.5 million Honeywell shares in 1976 -- grows to 2.2 million by 1978 . . . 20+% a year growth!

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" DECEMBER 4,1974 • VOL.10,NO.6 P.J.McGOVERN,PUBLISHER

Justice unwraps IBM case, cracks AT&T -- page 4.

ICL BRINGS THE FIRST OF ITS "NEW RANGE" TO THE STATES WHILE TOSSING OUT A BID FOR PARTNERSHIP

From the swank interior of New York's 21 Club one late November afternoon, International Computers Limited, Britain's sole force in the computer industry, kicked off its stateside marketing campaign and announced the opening of its first U.S. Customer Center. Both moves revolved around the first and smallest of ICL's New Range computers, the snappy 2903 . . . and follow the System/3 equivalent's heady success on the European front.

And during this ribbon-cutting event -- preceded by similar ones in Montreal and Toronto a week earlier -- ICL Chairman Thomas C. Hudson carefully let slip that the overseas mainframer is now casting for a partner in this North American adventure . . . one with the built-in sales and service force to serve as ICL's vehicle across the continent.

The deftly-sprung leak caused a stir. But even if it was designed to, it really just made official what has long been expected and considered a logical move on ICL's part. As for potential partners, Hudson seemed to eliminate nobody from the line-up. While reporters at the conference variously brought up the possibility of merger, partnership, acquisition, or even franchising of companies that run the gamut from small mainframers and mini makers to system houses and service bureaus, the ICL top brass merely smiled and repiped a "We're talking, we're open, and anything is possible" theme. Oddly enough, about the only companies he seemed to rule out were CDC and NCR, with whom ICL already has tentative links in Computer Peripherals Inc., still in its infancy.

The only requirement laid down by Hudson for liaison with his $500 million company was that ICL retain control of the operation and that its name and product line remain intact. As he admitted, the British company needs ready-built access to the American market . . . but it also needs a way to weave the ICL name and credibility into the market consciousness.

But in a way, the partnership queries at the press conference may have overshadowed the most crucial question of all: How does a foreign computer maker wedge its way into the biggest, most sophisticated -- and perhaps most competitive -- market in the world?

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Not easily, for sure. But Hudson and Dr. Chris Wilson, ICL's marketing director for the world outside of the U.K. and Europe, have a plan for cracking that hard but tasty American nut. Outlined as a "five-year plan," it's similar to the ICL New Range 2780 and 2790 computers introduced last month . . . modular, aimed at the end user, and built to weather unforeseen future developments.

Highlights of the battle plan are:

- Marketing of the 2903 through the use of Customer Centers. Here, future and current users learn to write programs and get a chance to test them, receive systems advice from ICL, and obtain hands-on experience with the gear. Use of the center is free, theoretically unlimited, and designed to provide each new 2903 installation with a fast and smooth start-up.

- If all goes well, follow-up with the rest of the New Range. At the high end of the line, the 2780 and 2790 (EDP/IR, Oct.24, 1974) -- roughly comparable to the IBM 370/158 and 168 -- are the only others currently available. But, allows Hudson, others less mammoth will be announced soon. And in private session with EDP/IR, marketing boss Wilson hinted that these might be next across.

- The establishment of manufacturing centers in the U.S. several years hence, again if all goes well. It's a logical step, and one ICL subsidiary, a software house by the name of Dataskil Ltd., is over here already, poised to provide software back-up for the 2903.

- Emphasis throughout on customer service and end-user satisfaction. ICL considers careful cultivation of the customer base as part and parcel of pushing a good product . . . crucial, in fact.

Getting a foot in the door

The success of ICL's "five-year plan" hinges on the 2903 . . . which in turn is pinned to the success of the Customer Centers. And their concept embraces the tricky maneuver of plying the user with service -- while still "getting him to come to us." Since the 2903 was introduced a year and a half ago, European and U.K. users have given the idea a jubilant welcome . . . and ICL expects the more pampered U.S. users will also. ICL rates its current support capacity at forty first-time users per each 2903 at a Customer Center.

So starting as it is in big, sophisticated, metro New York the plan could work . . . and at the press conference ICL's first U.S. 2903 recipient, Nat Sherman Incorporated, testified that it does. But later, as customers begin bumping elbows at the centers, and ICL's time and resources stretch into a more profitable investment/return ratio, some of that "Tender Loving Care" is bound to wane.

But the main limitation to use of Customer Centers is the inability to tap the vast hinterland markets . . . and ICL's philosophy concerning that limitation is summed up in this succinct dialog:

EDP/IR: But how do you extend yourself beyond that small radius about the customer center? How do you service the boondocks?

ICL[Wilson]: You don't.

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A look at the product

The closest IBM equivalent to the ICL 2903 is probably the System/3 Model 10, and ICL makes no bones about going after the same market -- a market which is potentially big enough for both anyway. The 2903 itself is essentially a small business entry-level system or big user IBM 370 adjunct . . . a disk-based, communications-oriented combo of hardware, software, and peripherals. Although OEM marketing may come later, the 2903 is currently offered only as a system.

Its basic configuration consists of:

+ Microprogrammed processor with multiprogramming capabilities and a semiconductor main memory with a cycle time of 1140 ns per 24-bits. Capacity starts at 16K 24-bit words and runs in 4K blocks to 32K. The operating system supports mainly RPG2, but compilers for Fortran and Cobol are also available.

+ One fixed and one removable disk for auxiliary storage of 10 million characters. Added units can expand that to 25 million, and larger disks boost it to 250 million.

+ Operator console with CRT and keyboard, a 300 card-per-minute (80 column) reader, and a 300 line-per-minute printer.

+ Optional key-to-disk data entry units (up to eight) integrated into the system and operational in various modes including verification, conversion, and supervisory.

+ Optional Visual Display Units (VDU) for conversing with the system and displaying data in the files. VDUs can be used for general inquiry -- or for the introduction of specialized communications systems such as on-line order entry.

+ Optional integrated tape drive attachment, extra applications software, interconnection to various other ICL peripherals, more powerful printers, and connection to IBM 370s through the use of an IBM 2740 Communications Terminal emulator.

Prices for the system haven't been announced yet, but ICL gives a "ballpark" figure of $2100 per month rental -- which translates roughly to $95,000 for purchase. According to EDP/IR calculations, the stateside price is slightly higher than the European tab, but according to ICL it's still 7 to 10% lower than IBM's charge for a similar package. One and five year leases are available.

Despite the fact that the 2903 and the System/3 will be jousting on the same fields -- and ICL even claims somewhat pugnaciously to be looking forward to the fray -- Hudson says that ICL prefers not to butt heads with the Giant. Instead, ICL's marketing attack is based on erosion. As Wilson puts it, "We prefer to nibble at the fringe, chip away at the perimeter. In a head-on clash with IBM we'd undoubtedly lose."

Behind that pincer philosophy lies ICL's vision of its machines in use . . . in distributed nets surrounding big, central IBM 370s . . . where the British computers can snatch processing chores and power -- convertible to revenue -- from the machines in the middle.

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ICL: the gentleman predator?

Not that ICL's top guns would mind the allusion. Where once the phrase "muddling through" fit the firm like homburg and gloves, a changing of the guard two years ago left Hudson in charge of a lithe, new management that seems to be moving toward the company's new goals with no wasted motions. As Wilson says, it's "a much more ruthless outfit." As for the new goals ICL seeks, they include doubling the company's business in five years to a billion dollar gross, tripling Wilson's overseas domain -- mostly in the States -- and ultimately reversing ICL's current 60-40 ratio of domestic to overseas trade.

Hudson feels well armed for the assault. "We have exploited the 1900 to its limits," he commented to EDP/IR. "Now we have the New Range, the 2900. We expect it to last even longer -- fifteen years or more."

"IBM," he added, "is still constrained by the architecture of the 360 -- or 370 if you want to think of them as different -- and still has several years to fully plumb its depths. In technology we're just that many years ahead -- as we were with virtual storage, as we were with platter technology, and as we are now with the virtual machine . . . which we think is what Future Systems is all about." He also hinted that follow-on New Range products would be easily converted to by users now shackled to that IBM technology.

Then there's the state of the business, which, according to Hudson, is good. ICL sales in Europe haven't shown any decline during the last six months of overall economic slump . . . and ICL is betting that orders will still pump in as wages spiral upward and companies automate to save money.

"You know, in a way these might be the best of times for us to move forward," muses Wilson. "We have a new product -- years and $400 million in the making -- and it's developed now. It works. We're a step ahead. And that puts us in a fairly enviable position." With that, ICL comes to town.

JUSTICE SPELLS OUT THE CASE AGAINST IBM . . . ASSUMING NO CONSENT DECREE

Unless the steady flow of rumors about consent decree negotiations between IBM and Department of Justice turn out to be true, it looks as if the mammoth trial may start on or near the sixth anniversary of its origin. DOJ has filed its pretrial brief -- a massive 338-page document outlining its case -- and IBM's counterpart filing is one of the major steps left before the case actually gets underway in New York City. It should be some trial. As the DOJ brief summarizes:

> The trial of the case can be expected to be a long one, even on antitrust standards, in part because IBM's power base in the relevant markets is very broad, touching a very large percentage of the commercial establishments that are the heart of U.S. commerce and industry. Its conduct in maintaining that broad power base will be largely reflected in IBM's own documents, culled down from the millions that have been examined by plaintiff's counsel during the years of preparation that have preceded the trial, but still representing an imposing number of potential trial exhibits.
>
> More importantly . . . plaintiff will offer . . . substantial evidence . . . relating to the structure of the general purpose electronic digital computer systems market and the barriers to entry in that market.

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. . . the only adequate relief is major structural relief along the lines set forth . . . October 13, 1972. [See EDP/IR Oct.26,1972 -- Justice asked that IBM be split "into several discrete, separate, independent and competitively balanced entities capable of competing successfully in domestic and international markets with one another and with other domestic and foreign competitors."]

So if the case goes to trial, it will be a long one. Estimates by the parties involved are that the elapsed courtroom time could be a year or more . . . and that the judge could take still another year in reaching his decision. That would mean early 1977 at the earliest for a decision -- if things go smoothly.

There is, of course, the school of thought . . . one to which EDP/IR subscribes . . . that a consent decree is the most likely, and could be the most equitable settlement. There are certainly arguments why it could be in IBM's best interest to negotiate a consent decree before a trial commences:

- IBM certainly cannot be sure it will win. Many of the issues are those raised in the CDC case (which IBM chose to settle) and the Telex case (which IBM lost in district court). Indeed, the go/no go on a settlement decision may be resting on the Telex appeal.

- An IBM loss to the government could be calamitous. Under the law, if the government wins an antitrust case, private parties -- competitors and even customers -- have a much easier time prosecuting treble damage suits. It essentially boils down to showing the extent of damage, then collecting triple. Such an action, of course, would at least substantially cripple the major computer manufacturer.

That the case will go this route is also of concern to the Computer Industry Association. Its latest bulletin discusses the possibility and promises that the CIA board of directors, at a mid-month meeting, will establish a set of minimum acceptable settlement guidelines to assist the Justice Department.

If a consent decree is to come, timing is critical. For IBM to get one of the major benefits of this out -- the opening statement as to "no evidence taken, no guilt established" -- it must be signed before the trial starts. For its part, the CIA is concerned that at least the provisions of the "Tunney Bill" -- providing for public access to and court participation in a decree's formulation -- be applied . . . whether or not the bill has passed Congress.

If the trial actually begins . . . and IBM has gone out of its way to state that it is not engaged in settlement discussions with the government . . . anyone willing to devote a year or more to the project will probably be able to get one of the most detailed "courses" ever conducted about the computer industry. At least that's the way the government's pretrial brief reads.

There will be insights into the people involved (box, page 6) as well as revelations about how IBM reacts to stimuli. (In January of 1968 IBM launched Project Yardstick -- featuring new measurement techniques such as expanding the market base beyond systems or tracking leased systems only -- to show IBM lacked market power.) And, EDP/IR would hope, there will emerge understanding.

In the event of trial, however, the significance will be more or less academic to most industry participants. No meaningful changes can be expected for two

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MEMORANDA FROM THE PAST -- ANY CLUES ABOUT THE FUTURE?

In preparing to bring trial against IBM, Department of Justice lawyers have read "millions" of IBM documents. Many will be seen and studied in great detail once the trial gets underway. Meanwhile, the trial brief contains a few -- and among them are some memoranda from T. J. Watson, Jr., head man at IBM during much of the activity questioned by Justice. Two of them tell a lot:

> August, 1963 -- Last week CDC had a press conference during which they officially announced their 6600 system. I understand that in the laboratory developing this system there are only 34 people, "including the janitor." Of these, 14 are engineers and 4 are programmers, and only one person has a Ph.D., a relatively junior programmer. To the outsider, the laboratory appeared to be cost conscious, hard working and highly motivated.
>
> Contrasting this modest effort with our own vast development activities, I fail to understand why we have lost our industry leadership position by letting someone else offer the world's most powerful computer. . . . I think top priority should be given to a discussion as to what we are doing wrong and how we should go about changing it immediately.
>
> October 25, 1965 -- By '62 we were beginning to hurt in the field. We made some major top level management changes to strengthen our field operation and bring new light into the hardware complex . . . and by the spring of '64 our hand was forced and we had to, with our eyes open, announce a complete line -- some of the machines 24 months early, and the total line an average of 12 months early . . .
>
> . . . My own conclusion to this is that we were so up against the wall saleswise that had we waited another nine months to announce the line we would have lost positions that we could ill afford to lose.

Some months later, IBM's present president, J. R. Opel had some reflections about the accelerated introduction of System/360:

> June 6, 1966 -- On the other side of the coin, in behalf of the people involved, is the breadth of the announcement and the advance in schedule of the April 7th [1964] introduction. Henceforth, we will instruct our people to avoid like sin a repetition of such a broad announcement and any announcement before its time.

The student of computer industry history, of course, recalls that first models of System/370 were announced early . . . probably to offset the effects of a recession. But a broad, full-line announcement was not made "before its time." So now . . . with a recession growing worse and more talk each day about IBM's Future System (FS) that was prematurely preannounced at the Telex trial last year . . . one is led to wonder if any repetition of history should still be "avoided like sin" . . . or whether times are really different!

years or more, and the current economic outlook calls for attention to business. What's more, there's the distinct possibility that, once a trial begins, IBM just might pull out all the stops . . . marketing more aggressively, introducing new products, and letting any "competitive" chips fall where they may.

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JUSTICE CALLS ON AT&T . . . IT'S A BUST

After fourteen months of investigation . . . and on the heels of FCC decisions, court rulings, and AT&T policy shifts loosening Ma Bell's iron grip on the telecommunications industry . . . the Justice Department finally lit a match under the Bell monolith. Extensive coverage by press and TV caused plenty of smoke -- which was fanned by AT&T Chief deButts' shrillish protests -- but which may really have been more than the fire warrants . . . for years will come and go before lawyers square off at trial. In that time technology will change, markets reshape, and legislation pass. Pretrial discovery itself may shed enough light -- and heat -- to bring change from within Bell.

So rather than rehash the events and history that have seen so much recent press coverage, instead EDP/IR muses in print . . .

. . . at the heart of the Justice Department case lies telecommunications, intimately related to data processing. Justice attacks Bell's actions not in the familiar local phone arena, but in markets that have changed radically since the last U.S. vs AT&T clash, resolved by a consent decree 18 years ago. Chairman deButts' argument that his regulated monopoly is the will of the people, therefore, may lose cogency in light of changes since that will was translated into law.

. . . although deButts expressed "astonishment" at the Justice Department action, few else in the industry did. AT&T's competitors hint that they felt something was in the wind, and at least one source indicated knowledge of meetings between AT&T and the Justice Department. AT&T's recent announcement of a policy thaw re interconnection may have been a "protective reaction" of sorts . . . part of the same "PR" effort that now has the company "going to the people."

. . . as for competition in the data communications field, the Justice filing should have a salubrious effect. Financing for the "little guys" should be easier to arrange, customers easier to find, and, to Bell's chagrin perhaps, court fights lent credibility. As one industry executive involved in the latest of these cases -- a treble damage suit filed two days before the Justice Department's on behalf of eight telephone equipment makers -- said, "the Justice Department action means we're not just crying and whining."

. . . for now it's "business as usual" for Bell. The company claims that absolutely no policy changes will result from the suit and that the Justice Department is making a big mistake . . . one that will cost the public twice: in taxes and phone bills. And after the initial shock wave, investors displayed a continued faith in AT&T . . . although the blue of its chip may have faded slightly.

. . . now the Justice Department, working with an annual antitrust budget of $16.7 million this fiscal year and a troop strength of 387 lawyers, will have to deal simultaneously with the two biggest cases it's ever had. Can it handle both as it asserts? Does the AT&T timing foreshadow a consent decree in the IBM case? Or could there even be politics and bureaucratic empire-building involved . . . as bedrock cynics suggest? . . . .

Indeed it's a momentous case, and one that will affect the computer industry -- as well as the general public -- in untold ways. And if the six to eight government lawyers now pitted against the telephone monopoly seem to have a tiger by the tail, it's their contention that what they really have is a mastodon . . . big, woolly, and powerful -- but dated.

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• TWO NEW JAPANESE NUMBER SLUGGERS COME TO BAT. After three years of development -- and a reputed outlay of $300 million in corporate and government funds -- the Japanese team of Hitachi and Fujitsu have announced the lead-off computers of its large scale M series: the M-180 and M-190. The first is a Hitachi creation, second a Fujitsu . . . and most of that time and money was spent in hammering out a uniform architecture and software interfaces.

Either model can run with one or two CPUs, comes with a 16K byte buffer storage (main storage is up to 8 MB on the 180, 16 MB on the 190), up to 16 I/O channels per processor, and either a medium or large scale operating system that allows for multiprocessing, virtual storage, real-time on-line operations, and remote batch control. Sundry applications programs and peripherals are also offered.

The parent companies stress the man-machine interface and tout their products' capability for high traffic on-line networking, data base/data communications, large scale scientific computing and so on. They also claim "The M-180 and M-190 models . . . surpass by far the largest computers, both domestic and foreign, on cost-performance ratio." That cost begins about $83,000 monthly rental for the M-180, $107,000 for the M-190 . . . and that performance will be pitted against IBM's 370/168 and Nippon-Toshiba's new ACOS Series 77 Systems 600 and 700. The Hitachi-Fujitsu number chompers -- to be marketed jointly -- should see first shipments late next year.

• MINI-BASED DATA ENTRY DEVICES OF JAPANESE-CANADIAN LINEAGE may someday sprout from a mutual assistance pact for closer technical cooperation recently signed by Fujitsu, once again, and Consolidated Computer of Canada. The Japanese mainframer currently markets CCI's Key-Edit 50 system and will now be transferring some of its own product technology to the Canadians. Closer ties may follow.

• WANG LABS REVERTS TO BASICS -- in its newest minicomputer, that is. Dubbed the Basic Computer 2220/2200S, this latest offering from the scientific outfit is a compact version of its System 2200 computer. It comes with a CRT console, tape cassette drive, a CPU hardwired for BASIC programming language, 4K bytes of memory expandable to 16K, and the ability to run one peripheral . . . with options for more available, as well as for telecommunications interfacing. Prices begin at $5,400 (leases available), lead time four weeks.

• CDC JOINS THE PRICE HIKE BANDWAGON by raising lease and maintenance charges on its large and small computers, peripherals, software and services. The medium scale 3000 series computers and the colossal CYBER 76 were exempted. Mainframe hikes were 7% for CYBER 172, 173, 174 & System 17s; 5% for CYBER 72, 73, 74s. All maintenance charges went up 8%, most peripherals 3-7%. The new CYBER 175 was boosted 10% (3% for purchase).

The escalations went into effect for new users on November 20 and will impact current users depending on their contracts. They come in the wake of rising labor, material, and financing costs . . . a red-ink third quarter for the company . . . and CDC projections of depressed fourth quarter earnings and resultant belt tightening.

• THE COMPANY WHOSE GADFLY COMPLAINT TO THE FCC forced Ma Bell to liberalize her interconnect policy for telephone answering machines, Phone-mate Inc., has been licensed by Ma to make the "Authorized Protective Connecting Module" that Bell said would be required to make interconnection safe for personnel and equipment. The squeaky wheel gets the . . . .

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" DECEMBER 31,1974 • VOL.10,NO.8 P.J.McGOVERN,PUBLISHER

Longer term perspective -- page 4

USERS STILL PLAN MORE SPENDING -- SOME INFLATIONARY, SOME REAL; FOCUS STILL ON TELEPROCESSING; MAINFRAME SHIPMENTS WILL DECLINE

Even the preliminary numbers are still coming in, but EDP Industry Report expects 1974 to stack up as a pretty good computeryear.

The outlook for 1975 is mixed. Mainframe shipments will certainly be down somewhat more than the decrease forecast early in 1974 as the recession emphasizes the tail end of a generation cycle. User spending, on the other hand, will increase some 13% in the U.S. as users delay new applications and limit or reduce staffing rather than cut back on hardware spending.

The recession will have its effect -- to be sure -- and for the computer industry, at least, it looks as if the "V" will be most appropriate of the various letter shapes being thrown around by economists. And it may be a shallow "v" at that. It's almost as if some of what would have been spent in 1975 was rushed into 1974 budgets -- and that a little more will be pushed back into 1976. All in all, however, computer users simply have too much inertia in their long-range plans to allow much change in equipment acquisition and spending.

During the Fall of 1974, researchers at the International Data Corporation, publisher of EDP/IR, have been checking closely with computer users -- first ascertaining their initial plans for 1975 as seen through September eyes . . . then checking again in late November as budgets for the new year began to firm. The results, obviously subject to trimming if business conditions worsen, indicate:

- The effects of inflation will be even more apparent during 1975 than in the previous two years. Of the projected spending increase of 13% by U.S. computer users, real growth in spending will be more on the order of 6% or 7%, several cuts below 1974's 10%-to-11% real growth.

- Term leasing from mainframers will be more important as both third-party leasing and outright purchases decline. This indicates user edginess as announcement time for new hardware looms on the horizon.

- Plug-compatible peripherals will be in high demand, penetrating two-thirds of large sites and one-third of medium ones by yearend 1975.

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1975 EDP BUDGETS FOR ESTABLISHED U.S. COMPUTER USERS
(Preliminary, Copyright 1974 by International Data Corporation)

Category	% of Total Budget	% Change, '75 vs. '74
Hardware Spending	39%	
Large Users		+ 8% - 10%
Medium Users		+ 13% - 15%
Salaries	41%	
Salary Upgrades		+ 7% - 8%
Staff Additions		+ 0% - 1%
Supplies	8%	+ 20% - 30%
Transmission Facilities	8%+	+ 20% - 25%
Outside Software/Consulting	Neg.	Up Slightly
Outside Services	Neg.	Mixed Pattern
TOTAL BUDGET		
Large Users		+ 10.6%
Medium Users		+ 14.5%
Weighted Average		+ 13.1%

Surveying the users

To arrive at the preliminary 1975 spending figures summarized above and discussed in this issue, IDC researchers prepared a sample of 130 computer using organizations -- many with multiple sites -- designed to be statistically representative of roughly 90% of the value of EDP equipment installed in the U.S. The remaining 10% -- small-scale users and new users converting from manual methods -- is not considered in this report. The users fall into two groups, with the same number of interviews conducted for each group.

+ The medium-scale sample represents 55% of the current value of equipment installed in the U.S. This is the true heartland of EDP growth potential, representing large-scale implementation of ideas proven at large, leading-edge installations. Users at these organizations expect to increase spending by 14.5% over 1974 levels.

+ The large-scale sample -- representing 35% of the installed base -- includes the leading-edge users . . . sites at which trends usually begin. This group was surveyed first in September, then two months later -- and during the firming up period had revised 1975 spending downward almost one percentage point to the 10.6% increase reported.

Although the distribution of the combined sample adheres closely to the distribution of computers by industry, it excludes federal government sites and is somewhat overrepresentative of the manufacturing sector. The first factor should have no relevance; the second actually may bias survey results downward -- prior spending surveys indicate that the financial and service sectors generally top the manufacturing sector by several percentage points.

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Trends -- the "DB/DC" theme shows up

The sample included non-IBM users in proportion to their installed base, but the results indicate that IBM has pegged its plans on the primary user direction -- or that virtually all IBM users follow the piper's tune -- because the overwhelming growth emphasis is on teleprocessing (data communications in IBM parlance). And the growing trend (significant for more than one-third the large-scale users) is centralized data base development.

Actually, this simply proved again the mainstream of computer progress. The development of teleprocessing will continue to be the key factor in computer industry growth for 1975 and for several years beyond. It's already a cornerstone of virtually all large companies' long-range plans, and is rapidly becoming a fact of life for medium-scale organizations as well. Almost 60% of the medium-scale users interviewed reported efforts in this direction, with one-third of these planning to get their feet wet for the first time in 1975.

Teleprocessing implementation, however, differs greatly by company size:

- Large-scale users tend to employ teleprocessing both for interactive terminal networks as well as for CPU centralization -- the replacing of small remote computers with remote terminals and an enlarged cenralized site, usually with the corporate data base.

- Medium-scale users at present are confining much of their development to interactive teleprocessing, with most of their efforts directed at local, in-plant applications such as on-line inventory control or on-line order entry.

- A growing number of medium-sized users are developing off-line teleprocessing applications -- transmitting data at remote sites to a central tape station or compatible intelligent terminal and entering it into the mainframe later, in an off-line or batch mode.

Tallying up the equipment dollars

Bearing out the trend described above, users report that the major portion of their hardware acquisitions during 1975 will be communications related peripherals. This will include large-capacity disk drives (for data bases), terminals, and communications controllers. New tape drives and add-on memory will play a smaller but significant role in spending plans for many users.

Indeed, the mainstay of computer spending during the initial phases of a generation cycle -- the upgrade of central processors -- will decline in importance during the coming year . . . probably until IBM's Future System is a known factor and competitive reactions to it are announced.

And for the users who are upgrading, mainframe vendor loyalty will be at an all-time high (EDP/IR Dec.18,1974). Supporting the statistical conclusions, the current survey found that less than 15% of users plan to switch CPUs during 1975, and just under two-fifths of those plan to switch vendors in the process. The key, in addition to other factors, is the extra cost in personnel and loss of computer center efficiency -- budget items that data processing managers think twice about in the best of times . . . and items that simply won't be tolerated when times are tight and pressures for immediate results are great.

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And the tab for hardware won't increase much in 1975, despite the well-publicized price hikes from vendors recently. Users with previously purchased equipment -- or with pre-existing extended term leases -- won't be affected. So, on the average, the price hikes will inflate 1975 hardware bills by just less than 2% for large organizations and by about 3% for the more rental-prone medium-scale sector. So the price hikes will have little effect -- although a handful of companies say they will investigate third-party and/or in-house maintenance as an alternative to paying more to vendors. Most find this inefficient, however.

Holding the line on personnel

Thus, with equipment demanding much less of a raise than the people in a data processing shop, there is more incentive than ever to let machines work. There will be little or no increase in overall staffing for 1975. A 3%-to-5% increase in programmer/analyst positions reported will be offset by declines in computer operations (2%-to-3%) and especially in keypunch operators (4%-to-5%). This last reduction reflects data entry's becoming more and more a function of user department personnel -- done as part of their job and not charged to any data processing budget -- via on-line keyboard terminals.

Users report, however, that the tab for in-house salaries will increase by at least 8% during 1975 as EDP salary levels readjust to the 1972/1973 wage-price freeze and current cost-of-living indicators. Data processing management reports, however, that it is willing to raise salaries in order to reduce staff turnover, especially for personnel with critical data base and data communications skills.

Other budget items

Hardware and salaries, as indicated in the table on page 2, account for 80% of the direct EDP budget for established users. The other two major items -- supplies and transmission facilities -- will both be up significant amounts, but for different reasons.

- Spiraling paper forms and card stock prices will push supplies costs up 25% to 30% during 1975. Users are concerned, however, and are looking seriously at items such as COM and/or microfiche; limiting distribution of reports; stockpiling, switching from six to eight lines per inch in printing; increasing use of CRT terminals; exception reports.

- Spurred by the emphasis on teleprocessing, the cost of transmission lines becomes a more important item in more user budgets. There is little most users can do with this item, since they still depend on AT&T. A few large-scale users memtion an interest in specialized carriers, and even they can commit only a fraction of their business.

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Perspective on the future

DEVELOPMENTS EXPECTED IN THE PROGRESS OF GENERATIONS

The longer term outlook is always easier to forecast than the immediate. And this is particularly so when direction rather than magnitude is the primary subject being examined. Nevertheless, looking ahead is important. So, EDP/IR finds it fitting to include in this yearend issue a perspective on computers and their use -- past, present, and future. This is taken from the presentation made by EDP/IR's editor before the Hart Subcommittee last summer.

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The chart called "Generations" of Progress (page 6) is an attempt to put, on one piece of paper, highlights of what computers and computer use and computer acquisition and the alternatives available at a point in time are all about. It is strictly EDP/IR's "invention" . . . and as such it may not be precise to some technologists. But we find it useful.

Across the top, we have broken the history of the computer industry into time periods, or generations, of roughly five years each . . . a little longer at the start . . . no cutoff date for the future. We think the dates are generally accepted ones.

We haven't begun to list specific products. In general, we had the "named" machines at the beginning: Large, slow, clunky monsters that ushered in the age of the computer. Each had a personality; few of any were built. It was during this time period that some very important people were saying that two or three dozen of these machines would take care of the world's computational needs!

At any rate, we've gone from these scientific wonders of the middle 1950s -- machines with names like Eniac and Alwac and Univac -- to the business-oriented second generation computers (epitomized by IBM's 1401) that brought data processing to many businesses -- to families of machines that each manufacturer offers today. Looking out into the future, it appears that the concept of network computers and networks of computers will change today's concept of just what a computer is, anyway.

Coming down to the next line, we have electronics -- the circuitry used within computers. This is what led to changes being called generations, because during the time involved, very different generations of electronics were coming along. In the past 20 years we have seen electron or vacuum tubes replaced by transistors and then discrete transistors replaced by integrated circuits, or collections of transistors photographically manufactured on a chip. The insatiable drive to make these circuits smaller and faster will continue.

In main memory, delay lines quickly gave way to rotating drums. By the late 1950s, the magnetic core was introduced to hold the computer's information, and this was the norm (in improved versions) until the last few years, when semiconductor memories of various types began to be accepted. In the labs, scientists are talking about combinations of circuits and memories that operate at temperatures near absolute zero but that put the power of today's largest computers into the space the size of a desk drawer.

Auxiliary memory -- used to hold information that is needed only on an occasional basis -- has progressed from decks of punched cards to the tapes so often used to symbolize the computer to large disk stacks to mechanized tape libraries. Clearly on the horizon as very large auxiliary storage devices is the Bell Lab invention called the "bubble memory." These should be coming along in a few years.

Data entry has gone from the card punch (which will remain the most populous input method for another few years, still) to various key-capture units to the concept of direct data entry.

Output has progressed from the "flashing light" era of the early computer to faster and faster printers. In the future, management by exception techniques will be applied to the computer so, rather than getting reams of printout, we

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"GENERATIONS" OF PROGRESS

GENERATION	EARLY	SECOND	THIRD	TODAY	FUTURE
DATES	1951-1958	1959-1964	1965-1970	1971-1976	1977-----
PRODUCTS	"Named" Machines	Business Oriented	Families----------Networks----------		
ELECTRONICS	Vacuum Tube	Transistor	Hybrid Circuits/Integrated Circuits/Large Scale Integration		
MAIN MEMORY	Delay Line/Drum	Magnetic Core	Core/Plated Wire	Semiconductor	
AUXILIARY MEMORY	Punched Cards/Tape	Drum/Tape/Disk	Improved Disk/Tape	Advanced Disk/Tape Library/Bubble Memory	
DATA ENTRY	Paper Tape and Punched Cards		Punched Card/Key-to-Tape/Shared Processor/Direct Data Entry		
OUTPUT	"Flashing Lights"/Slow Printers/Line Printers/Tape/Display/Disk/High-Speed Printer/Documents/Action				
ARCHITECTURE	Logic+Memory+Control+Input/Output		+Larger Auxiliary Memory+Teleprocessing+Multi-Processors		
PROGRAMMING	Brute Force/Assembly Language/Compilers/Operating Systems/Emulation/Data Base-Network Processing		Software Packages	On-Line Guidance	Transparparency
USES	Computation	Financial DP	Information Processing	On-Line IP	Answer-Orientation
ACQUISITION	Purchase----------				
	Rent----------				
			Third-Party Lease (Short- or Long-Term)----------		
			"Unit" Pricing----		
ALTERNATIVES	"Borrow"	Service Bureau	Time Sharing/Remote Service/Minicomputer/Turnkey System		

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will begin to get only meaningful documents or displays. Necessary data may be "dumped" directly onto microfilm for look-up when needed. And, paralleling the development of exception reporting will be action output -- such as direct control of machines or automatic transfer of funds.

The architecture of computer systems -- the way their elements are put together -- will continue to move away from the classical combination of a processor, a memory, some control circuits, and an input/output unit to the network, oriented around a vast memory around which many special-purpose and general-purpose processors are hung and all of which is really determined by the operating system -- the instructions that tell the computer how to work with the various elements that make it up.

Throughout all of this movement, the thrust will be transparency -- the provision to the user of a system he can't see -- a system that provides answers. Along with this answer-orientation, we would expect that manufacturers will begin to price systems not by the box or the pound, as it were . . . but by the transaction. Indeed, we are convinced there will be a general movement toward the automation of business transactions.

As the nation's monetary system and various reservation systems get connected with credit and retail systems . . . and with hospitals and hotels and insurance programs . . . as autotransaction takes off and eventually brings the advantages of data base access into the home ... things will change.

Certain manufacturers -- Control Data, in particular -- have already stated goals along these lines. The timesharing companies, the turnkey systems houses answering specific problems with tailored products, the large companies not even closely identified with the computer industry today yet considering vast service operations . . . all of these will compete for the increasing computer dollar. Many of them will begin to offer valid alternatives to computer users.

But this is truly the leading edge. For the user who wants to continue to do his own thing -- and we are practical enough to admit that, for quite some time, the majority of users will want to have their own computer and control its use -- there are questions that lie ahead.

The next round of applications many users are planning require real-time involvement of their business operations. They will be able to put up with slowdowns, but not failures. They will be extremely concerned by security. They will have so much invested in software -- programs or instructions for their machines -- that they may not want to rock the boat. The language of computers in a few years <u>may</u> or it <u>may not</u> be conducive to shifting mainframe manufacturers . . . or shifting from one service supplier to another. Today it often isn't. We do not know whether or not it is truly possible.

We are dealing with a large investment by the computer users of the nation. This is an investment not so much of money -- they are getting value from their $30 billion worth of computers -- but an investment of skills. The salaries paid programmers and systems analysts over the years have gone to the capturing of skills, thinking through of problems and adapting them for particular computers.

No matter what happens, users can't afford to toss out these captured skills. That means they must have confidence in the future of their computer equipment manufacturer -- no matter who it is.

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• THE DIE HAS BEEN CAST FOR BURROUGHS TO ACQUIRE GRAPHIC SCIENCES, INC., namely through a "definitive agreement" between the two companies . . . following by one year the original "agreement in principle" that the buy-up take place. Graphic's stockholders will get a chance to vote on the move in a special meeting that will take place in early 1975.

Terms of the proposed acquisition are pinned to the going price of Burroughs' stock in the five days immediately preceding that special meeting. To wit, Burroughs shares will be exchanged at a one to eight rate for shares of Graphic Sciences unless the average Burroughs share on the ticker-tape is less than $72 . . . in which case Burroughs will buy the Graphic Science shares at a flat $9.44 each. SEC approval still pends.

Graphic's operations will remain in Connecticut and should be little altered by the acquisition. According to a spokesperson for the manufacturer of FAX equipment (revenues of $15 million last year), adoption by Burroughs will give the company and its stockholders marketing and management advantages it didn't have before. That's probably true. What's curious is that the Michigan mainframer has entered the World of Facsimile at all.

• GIMBELS HAS ENTERED THE POS PARADE by selecting General Instrument Corporation's Unitote Division to install more than 1500 POS terminals at 21 New York and Philadelphia locations. Starting in Valley Stream, NY, early in the new year the $5 million contract will spread that installation out over a period of two years. Stores will use the Unitote Model 302 terminal -- containing a fully programmable microprocessor -- and various peripherals, including store and central-level minicomputers, magnetic tape drives, mass storage devices, teletypes, and so on. Communications minis and in-store controllers will provide for "on-line" operation. Gimbels' decision was based on successful tryouts of other General Instrument POS gear in Pittsburgh and Milwaukee.

• DATRAN EXPECTS TO BEGIN ITS "SWITCHED SERVICE DATA DIAL" between Houston and Chicago on January 2, New Year . . . providing dial-up digital data transmission service between the two cities and five others in-between. This will follow three months of trials with selected customers. Then, soon after the new year begins, Datran plans to connect with the West Coast . . . by sharing microwave facilities with Southern Pacific Communications, another specialized common carrier. (SP will handle the analog end of things, Datran the digital). After that, Eastward ho.

• IT'S TINKERS TO EVERS TO CHANCE -- or rather TRW Datacom, to Oy Nokia AB (Finland), to the Soviet Union -- for the TRW subsidiary has announced agreement with the big Finnish corporation to handle marketing of its Datapoint computer equipment in Russia. The equipment includes low-cost terminals and communication equipment for retail and banking applications . . . and will be targeted primarily for use in dispersed data processing operations which link with large central computers -- consistent with the size and geographic spread of Russian industry and population. According to a Datacom VP, "As far as we know, there are no intelligent terminal communications systems developed in the Soviet Union and the Datapoint equipment should stimulate significant interest."

• BESIDES WISHING ITS READERS A JOYOUS HOLIDAY SEASON AND A FRUITFUL NEW YEAR, EDP Industry Report and its publisher, International Data Corporation, would like to announce a new address as of the first of the year. Located in larger, more centrally located quarters, our new address will be: 214 Third Avenue, Waltham, Massachusetts, 02154. Telephone: 617-890-3700.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JANUARY 20,1975 • VOL.10,NO.9 P.J.McGOVERN,PUBLISHER

IBM'S SYSTEM/32 EXPOSES ANOTHER STRATA OF USERS TO COMPUTERS

It's a computer industry phenomenon. Just one week after IBM collected some 80 trade and business reporters, rushed them off to Atlanta, and held its first actual press conference since the 370 introduction, the subject of the announcement -- System/32 -- seemed to be an accepted part of the vocabulary. This illustrates the think/speak manner in which new IBM terminology becomes the norm.

So what is System/32? Officially, it's "a compact easy-to-operate system for first-time computer users in small businesses . . . supported by Industry Application Programs developed specifically for new users in construction, wholesale food, wholesale paper and office products, hospitals, and membership organizations and associations." Hardware consists of a CPU, memory, disk, diskette read/write facility, keyboard, visual display screen, printer -- all in a single desk-sized unit.

That's the way System/32 comes across to the user. Its message to the industry -- though not spelled out in any press releases -- is also quite clear. This inevitable move down into yet a lower and larger strata of the business pyramid -- a full-fledged computer for less than $1,000 a month -- has three characteristics or qualities that will eventually set industry trends. S/32 is:

- Punch-cardless, and therefore offers no market for a keypunch (or jobs for keypunch operators). And it's tapeless. The only media this product supports at all is the flexible diskette (floppy disk).

- Programmerless, perhaps the first implementation of an FS/Q concept that probably portends the future direction of IBM offerings. Even the RPG II language for programming System/32 will cost extra.

- Plugless, at least to independent peripheral equipment manufacturers. The System/32 may open a new marketplace for other systems makers, but with the entire product in a single box (it comes in 10 models with different speed printers, etc.) there's not much to replace.

And to IBM, the System/32 represents a continuation of the entry-level business it has gone after successively with the 650, the 1401, and System/3. S/32 will mean the largest selling product ever (EDP/IR estimates 40,000 will be shipped in the three years ending with 1977, perhaps another 30,000 before 1980) and basis of a $1-billion-a-year revenue flow by the end of this decade.

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SYSTEM/32 -- WORLDWIDE MARKETPLACE POTENTIAL
(Forecast, Copyright 1975, International Data Corporation)

Year	Shipments (Units)	Installed Base (Units)	Annual Revenue ($ Million) Hardware	Software	Total
1975	5,000	5,000	$ 20	$ 13	$ 33
1976	15,000	20,000	120	50	170
1977	20,000	40,000	330	100	430
1978	17,000	57,000	560	135	695
1979	13,000	70,000	$ 760	$ 165	$ 925

Basis of big business?

Numbers such as these -- spelled out above in more detail -- are impressive even by computer industry standards. With System/3 giving IBM's General Systems Division something like $600 million or $700 million a year in revenue already, and with System/7 (also under GSD's bailwick) accounting for well over $100 million a year in revenue, one could argue that GSD is -- or soon will be -- the second largest computer "company" around.

Indeed, GSD is completely integrated from a research, development, sales, service, and support standpoint. Given an adequate "bankroll," it very likely could operate completely independently from IBM's other computer divisions.

Some of the press representatives who went on the trip to Atlanta agreed they would not have been surprised if IBM had announced that it was voluntarily divesting GSD. And from a product standpoint, there is very little real compatibility between S/32 and 370 . . . just RPG.

Of course, the System/32 could be upward compatible with FS! Or, it could be simply the start of an entire new family of computers. The numbering system chosen (see below) uses only two letters of the alphabet . . . and only three digits. There are more of each.

New pricing practices

Several elements of System/32 pricing represent a departure from practices more or less accepted with IBM computers of late -- some are more like those used with office products, or the accounting equipment with which some 32s will be competing. The implications could signal new directions for IBM . . . or emphasize once more that the General Systems Division is truly autonomous:

- Software is priced completely separately, with packages for each industry plus a couple of "data processing" selections -- the RPG II language priced at $25 a month, a set of utilities (sorts, etc.) for $15 a month. The Industry Application Programs have an initial charge (presumably for customization) that is 20 to 24 times the monthly license fee. Of the IAPs announced, the range is $2975 (up front) plus $140 a month for wholesale food to $1485 plus $62 a month for the membership organization/association package.

- Hardware, on the other hand, is completely bundled. There are actually ten different models labeled from A12 to B33 under a scheme that

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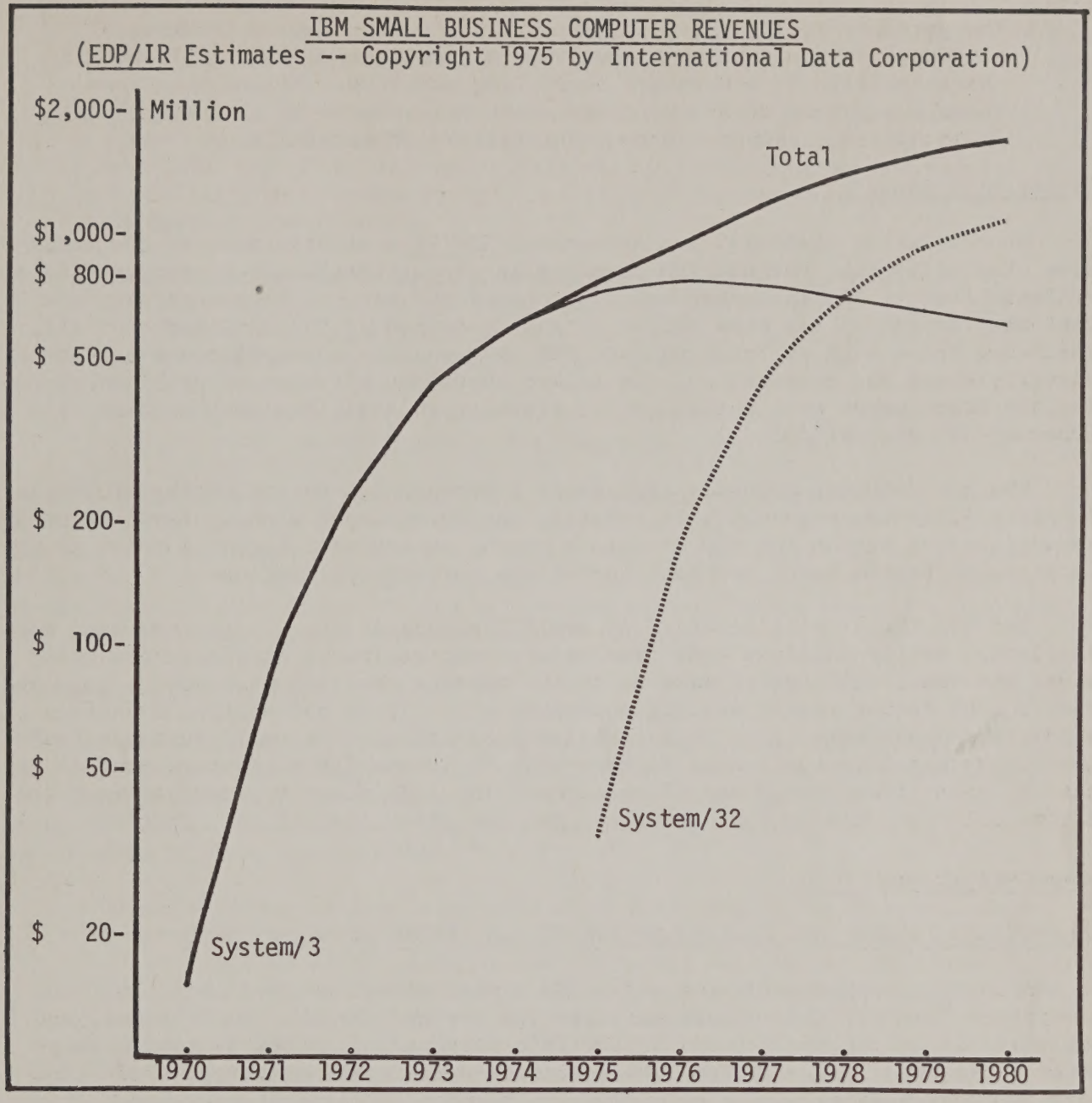

works as follows: The first letter is an "A" or a "B" depending on whether the printer is a serial matrix or a line printer. The speed of the printer (40 cps or 80 cps for serial, 50, 100, or 155 lpm for the line printer) calls for a 1, 2, or 3 in the second position. The last digit of the number is a 2 or a 3 depending on whether a 5.0 or a 9.1 megabyte disk is selected. Thus, the B22 has a 100 lpm printer and a 5 MB disk; the A13 has a 40 cps printer and 9.1 MB disk.

- Actual rental (MAC or Monthly Availability Charges) are available for System/32, but the real basis for pricing is the TAP or Term Availability Plan. This is a three-year lease agreement that starts 5% lower than the MAC and that guarantees the user he will not receive more than a 5% a year increase in monthly charges during the term of the contract. Thus, IBM has agreedto limit the amount a user's EDP equipment bill might be hit by inflation.

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The purchase-to-TAP ratio is just over 40 -- low (and suggestive of purchase) for a computer system, but higher than the 32 or 33 that is characteristic of electronic accounting machines. Maintenance runs about 6 per cent of the purchase price per year -- in line with highly mechanical peripherals such as printers or terminals.

Competitive impact

Shortly after System/32 was announced, EDP/IR contacted some of the companies that might feel the new IBM presence in the marketplace. A representative of Basic Four -- who explained how his company had more of a computer but one that was focused on the same market -- really summed up the situation for all, including those such as Burroughs and NCR that make it a practice not to comment directly about the competition. He talked about the bittersweet problems of having the Giant enter your market -- the blessing on small business systems, the curse of IBM domination!

The new computer actually represents a two-pronged threat in the marketplace. It has a nifty new engraved-belt printer, can be equipped with a bisync or an SDLC communications option for $90 or $110 a month, so may well become popular as an intelligent remote batch terminal in various network applications.

But its thrust will be aimed at small organizations . . . the new user marketplace. And it could be some time before some equipment manufacturers going after the same, vast market wake up to the message that IBM is sending, loud and clear. IBM is not really selling equipment . . . it is not selling a package of hardware and software . . . it is selling a solution. The small business customer for System/32 doesn't care to know that it is heavily microprogrammed -- or that a competitive system can offer timesharing. He wants to know how much the system will save him in his business. And how effortless it is. That's all.

\+ + + + +

Computers at new sites

AS SYSTEM/3 PEAKED, IBM TALLIED UP 80% OF U.S. ENTRY-LEVEL BUSINESS

In announcing the System/32 (page 1), IBM stated almost prophetically that the new system "has all the success earmarks the System/3 had." That's a lot, and obviously is one of the factors in EDP/IR's forecast of 40,000 System/32 shipments by yearend 1977. System/3 made quite a dent in the nature of first-time user computer business.

Indeed, in analyzing new site installations as part of its annual survey of customer "brand loyalty," EDP/IR found that IBM's success in winning new sites was not only greater than its overall market share would indicate . . . the survey data showed that IBM's penetration of new-user business actually increased with System/3's lifespan (see charts, page 7).

As was the loyalty survey (EDP/IR Dec.18,1974), the new site survey is based on the extensive data files of International Data Corporation, the Gray Sheet's publisher. It covered domestic new site activity for 1973 based on installations of single systems and gave preliminary data for 1974 based on orders and first-half installations. Among the findings:

- From the level of 59% of new sites in 1970 (the first year of System/3 shipments), IBM grew to a 78% share of this market by 1973 -- with the

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forecast for 1974 dipping down to 72%. By value, the Giant captured 78% of the new site market in 1973, 75% in 1974.

- In general, the other mainframers divvied up the remaining new sites almost equally by number with the exception of Univac, which for 1973 and 1974 racked up only about half the number scored by the others. By dollar value, however, this new site business was about the same as that of the others in 1974.

- In 1973, entry-level systems accounted for 71% of all shipments to new sites by number in the U.S., and some 30% by value. Thus, IBM's System/3 accounted for 80% or more of the entry level business, with 58% by number and 24% by value of all new site business.

- By value, shipments to new users continues to drop in comparison to overall computer shipments. The figure was less than 8% for 1973.

Looking over the historical data, an observer could say that a general downward trend in non-IBM new site market share bottomed out in 1973 . . . or that IBM realized a saturation point was being reached, so moved the bottom downward by introducing the System/32. Looking at the record for the other mainframers, it is clear that Burroughs is the only other company to increase its share of entry level business during the last several years.

Limitations to the study

As mentioned above, the data discussed on these pages and summarized in the tables on page 7 was prepared from IDC files as part of the loyalty study, major conclusions of which were presented last month. And, like the loyalty study, this analysis of new site computer business has built-in, inherent limitations. Pertinent parameters and cautions are:

+ Figures presented here represent only general-purpose (Group A) computers manufactured by U.S.-based companies and installed at U.S. sites. Equipment acquisition method is not considered, so a new user obtaining equipment from a third-party lessor would still be considered a customer of the equipment manufacturer.

+ The new site analysis does not include Federal Government installations. In general, government agencies play a small role in the entry-level Olympics, and the percentages reported would be relatively unchanged. If any changes were visible at all, IBM and Univac might show relatively small gains.

+ New sites -- not new users, per se -- are counted. This is extremely important to remember, since a new site could represent a large company's branch installations, a move to new corporate headquarters, and the like. Because of this, dollar figures may be heavily weighted by a few installations of big systems.

IBM . . . and the rest . . .

The numbers in the summary tables do not reflect the machinations within a vendor's product line that invariably occur. But an examination of the numbers behind the numbers, as it were, discloses what could be called predictable pat-

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terns. In 1973, for example, IBM's big seller was the System/3, Model 10 -- going to about half of all new IBM sites. With other potential best sellers -- the 370/115 and the System/3, Model 15 -- announced but not delivered, the old 360/30 actually showed the greatest new site appeal.

And again in 1974, the 360/30's appeal remained the same (6% of all new IBM sites) while the 360/40 crept up from 2% to 4% -- both reflecting cost-conscious new users opting for good deals from third-party leasing companies. But the new equipment showed up . . . with the System/3, Model 15 soaring to the second most popular slot after the Model 10, and the 370/125 moving into third runner-up spot by drawing 7% of the new sites.

On other fronts: Over half the Burroughs new site installations -- in both 1973 and 1974 -- were B 1700s. And by 1974, the smaller B 700 had begun to show up and, with 16% of the new Burroughs sites, moved into second place.

For Honeywell, the big winners in both years were the G-58 and the H-2020 -- which split 65% of the company's new sites in 1973, 58% in 1974. Of the two, the H-2020 -- which had its initial deliveries in 1973 and ran second that year to the aging G-58 -- out-distanced the surprisingly tenacious "oldster" by 1974.

And for NCR -- to which entry-level systems represent the bulk of the value of new site business -- the Century 50 and the 101 shared the honors in each of the last two years. In 1973 they accounted for three-fourths of NCR's new sites, in 1974 over 90% (and almost as much, 78%, by dollar value) with the newer, bigger 101 slowly pulling away from the 50.

Univac's 9200 and 9300 have been its biggest attraction at new sites in the past . . . but are waning, with the 9300 slipping entirely from the sample data in 1974. By itself, the 9200 accounted for 35% of Univac's new sites in 1973, 40% in 1974 (but only 10% by value). There has been talk of an entry-level system from Univac for some time, but until then, it seems obvious that entry-level business will not be Univac's strongest market.

CDC, Singer, and DEC comprise the bulk of the manufacturers classified as "Others." Because these manufacturers have diverse product lines and account for a small portion of the business, their sample size is small in the survey and no meaningful data can be presented. In general, however, Singer -- with its System/10 -- could gain significant new site business as backup to POS systems, but probably not so much new user business. DEC, again, is just making inroads into the general-purpose new user market . . . except for occasional large timesharing service bureau contracts. And CDC, likewise seldom a new user supplier, could easily skew any curves in a dollar value accountability.

. . . and more from IBM

When IBM introduced the System/3 five years ago, it wedged its way downward into a new market . . . and brought the IBM nameplate -- not to mention the electronic computer itself -- to more new users than ever. Now, with its General Systems Division operating somewhat independently from Atlanta, IBM brings us the System/32 . . . which has the probability of once again bringing computers to more people than ever before. The S/32 will change the definition of potential computer user . . . and make new sites harder than ever to count. But odds are there's a viable market there for a whole new round of competition . . . as soon as the other entrants can find a niche and the right way to enter it.

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COMPUTER INSTALLATIONS: NEW SITE ANALYSIS

(Copyright 1975 - International Data Corporation)

% New Sites By Vendor

	1970	1971	1972	1973	1974
Bur	4%	3%	3%	6%	7%
HIS	8%	10%	8%	6%	7%
NCR	18%	15%	11%	6%	8%
Uni/RCA	8%	7%	6%	2%	3%
Others	3%	1%	5%	2%	3%
IBM	59%	64%	67%	78%	72%
	100	100	100	100	100
Sample:	446	738	1344	1214	471

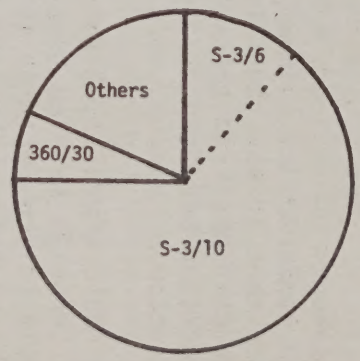
	1973		1974	
	% by $	Sample: $K	% by $	Sample: $K
Bur	8%	24925	6%	8535
HIS	5%	14068	6%	8750
NCR	3%	10889	4%	5154
Uni	2%	5614	5%	6534
Others	4%	13486	2%	3470
IBM	78%	242610	75%	109280
	100	311592	100	141723

NEW SITE ENTRY LEVEL SYSTEMS: 1973

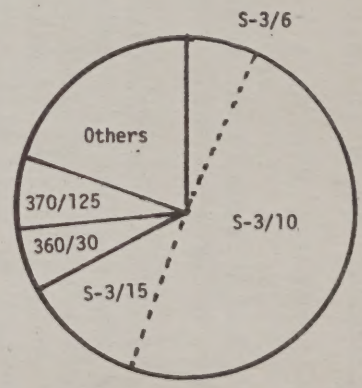
		% of Mfg By #	% of Mfg By $	% of All By #	% of All By $
Bur	B-1700	54%	22%	3%	2%
HIS	G-58 & H-2020	65%	29%	4%	1%
NCR	C-50 & C-101	75%	60%	5%	2%
Uni	9200 $ 9300	78%	50%	1%	1%
IBM	System/3	78%	31%	58%	24%
Total		--	--	71%	30%

IBM NEW SITE SYSTEMS

1973



1974



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• HONEYWELL STRUCK IT BIG IN MOTOWN LAST MONTH when it landed an order for 19 of its Model 66/20 computers with Ford Motor Company. The value of the order runs to $25.6 million, and, according to Honeywell chief, E.W.Spencer, it's the largest single order received for the new Series 60 line.

The computers will go to 19 of Ford's 21 U.S. and Canadian Automotive Assembly Division plants. Each system will come with a Model 6600 communications processor . . . for telecommunicating with Detroit. System size will vary depending on plant size, but the smallest -- valued at $1.1 million -- will come with 95K bytes of main memory, and the largest -- valued at $1.8 million -- will have 192K bytes. First installation occurred last month.

One feature of the deal -- perhaps unique -- is the acquisition arrangement: a combination of normal and third-party lease. Neither Honeywell nor Ford would indicate immediately who the third-party lessor is . . . but they did admit that it was the CPUs that are on that third-party lease, while peripherals come straight from the mainframer. Also, both companies said that the plant shutdowns that had over half of those 19 plants idle this week (slated to return to operation on Monday) would have no effect on the installation schedule.

• WYLY CORPORATION HAS GONE GREYHOUND with an agreement in principle to sell its Computer Leasing Company to the Greyhound Corporation. If approved, the buy should be completed in thirty days -- at a cost to Greyhound of $20 million in cash and notes. Figures published by Wyly indicate that Computer Leasing had $150 million in its portfolio (at original price) as of mid-1974 . . . and so Greyhound, which "drew a by" in the 370 leasing derby, appears to be getting ready for a fast start out of the blocks when FS comes around. Wyly, in the meantime, has other projects on its mind . . . such as Datran, for which it just picked up $10 million in financing from Haefner Holding AG of Zurich.

• SOS FOR SOS? Well, not exactly, but General Automation has announced the return of its exotic Silicon-on-Sapphire semiconductor process to the development stage. The move was brought about by production yield problems and a drying up of its major SOS source when Rockwell International withdrew its chips from the commercial market. According to GA, sending SOS back to the drawing boards should have effect on sales, since for one thing, the company can offer alternate technology with little schedule delay . . . and for another, the company had hedged its SOS bets anyway by not overcommitting to production of the LSI 12/16 and the LSI 16 . . . the two microcomputers that would have used the chips.

• IN A FINE DISPLAY OF P-O-S MANSHIP, R.H.MACY & CO announced plans to convert its New York's Herald Square store to POS operation. Archrival Gimbels took the plunge last month (EDP/IR, Dec.31,1974). The Macy's version calls for installation of 425 NCR 280 electronic terminals and supporting equipment -- valued at $1.5 million -- to start next quarter. Some front end processors and data concentrators will be included . . . and instant credit authorization will be featured. According to NCR, it will be the largest POS system ever packed under one roof -- and the retail duel between NCR and Unitote, General Instrument's entry, goes on.

• BUT GIVING RETAILERS A CHOICE IN THIS POS MATTER IS ANDROCOR, INC., a subsidiary of Boeing Computer Services which has just announced new nationwide computer services for retailers . . . BYOET (Bring Your Own Electronic Terminals). Minicomputers will poll the various store sites and gather the data, then an IBM 370/168 -- reached via a teleprocessing link -- will do the actual data processing.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JANUARY 30,1975 • VOL.10,NO.10 P.J.McGOVERN,PUBLISHER

Mini outlook: Far from bust! -- page 4

DECISION OVERTURNED AS PLUG-COMPATIBLE MARKET NOT ACCEPTED; IBM EXONERATED OF PREDATORY ACTS; TELEX PENALTY REDUCED TO $18.5 MILLION

I'm down to the edge lawn, and I think the best service I can do is to speed the matter to that final determination. If I'm wrong on my market definition, then you did what you had a right to do.

-- U.S. District Judge A. Sherman Christensen to IBM at post-trial hearing, Oct. 17, 1973

It seems clear that reasonable interchangeability is proven . . . the market should include not only peripheral products plug compatible with IBM CPUs, but all peripheral products, those compatible not only with IBM CPUs but those compatible with non-IBM systems. This is wholly justifiable . . . these products, although not fungible, are fully interchangeable and may be interchanged with minimal financial outlay. . . .

The court's very restrictive definition of the product market . . . must be regarded as plain error. . . .

The "acts" found by the trial court to be illegal were ordinary marketing methods available to all in the market. . . .

IBM's costs were above others in the market. . . .

. . . technical attainments were not intended to be inhibited or penalized by a construction of section 2 of the Sherman Act to prohibit the adoption of legal and ordinary marketing methods already used by others in the market, or to prohibit price changes which are within the "reasonable" range, up or down. Under the unusual market circumstances before us, to so interpret the Act . . . was an incorrect interpretation of applicable law. . . .

. . . these acts of IBM are . . . part of the competitive scene in this volatile business inhabited by aggressive, skillful businessmen seeking to market a product cheaper and better than that of their competitors.

-- U.S. Court of Appeals, Tenth Circuit in opinion handed down January 28, 1975

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Initial word spread rather quickly during Friday evening, January 24. Trading in IBM stock was halted until the following Tuesday. In a sweeping decision, the Tenth Circuit Court of Appeals (Denver) completely overturned the findings against IBM in the Telex antitrust case . . . but upheld the trade secret misappropriation charges against Telex, reducing its damages to only $18.5 million.

Why? The quotations on the first page really tell the story. It looks as if the appeals court took Judge Christensen fully at his word. They decided his market definition was wrong . . . and concluded that IBM had not violated the law. It was very much a "win" for IBM.

About the only thing Telex got out of the decision was a slight trimming of the damages it now has been told to pay IBM. The appeals court threw out the provision for increased security and more expensive in-house manufacturing . . . and reduced the Telex damages to $17.5 million compensatory and $1 million punitive. (Indeed, the Court said "in view of what we deem to be rather flagrant conduct on the part of Telex, the trial court exhibited considerable restraint in its award of punitive damages.")

The pivotal issue

As was pointed out when the Telex case went to trial (EDP/IR June 22, 1973), the crux of the suit is relevant market. As Christensen said -- and the Denver team of Seth, McWilliams, and Doyle affirmed -- the whole thing swings on market definition. The law on this point -- at least as argued by IBM and as accepted by the Tenth Circuit -- stems from "the famous case of United States v. DuPont de Nemours & Co.," as the Denver trio describes it:

> In this case, as in the case at bar, the scope of the products market was crucial. The Supreme Court determined that if one product may substitute for another in the market it is "reasonably interchangeable." It was applied there even though DuPont largely controlled the production of cellophane. It was held to be not guilty of monopolization simply because the relevant market included cellophane as well as other flexible wrapping materials. On this the Court stated:
>
> > "[W]here there are market alternatives that buyers may readily use for their purposes, illegal monopoly does not exist merely because the product said to be monopolized differs from others. If it were not so, only physically identical products would be a part of the market."
>
> One evidence of cross-elasticity is the responsiveness of sales of one product to price changes of another. But a finding of actual fungibility is not necessary to a conclusion that products have potential substitutability. In this respect the Court said:
>
> > "Every manufacturer is the sole producer of the particular commodity it makes but its control in the above sense of the relevant market depends upon the availability of alternative commodities for buyers; i.e., whether there is a cross-elasticity of demand between cellophane and the other wrappings. This interchangeability is largely gauged by the purchase of competing products for similar uses considering the price, characteristics and adaptability of the competing commodities."

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The opinion, as might be expected, elaborates on the idea of relevant market as presented in DuPont:

> . . . one can think of building materials as in commodity competition but one could hardly say that brick competed with steel or wood or cement or stone in the meaning of Sherman Act litigation; . . .
>
> . . . there are certain differences in the formulae for soft drinks but one can hardly say that each one is an illegal monopoly.

And "one of the most significant decisions of all" is the Supreme Court's ruling in the Grinnell case that the relevant market was very broad, combining automatic burglar alarms, fire alarms, sprinkler supervisory services, and watch signal services. "The basis for combining these various products was that all of them provided protection of property."

That's the way it went . . . the crux of the case. Monday morning lawyers may argue that the law has been misinterpreted; other observers have had trouble understanding how a company could monopolize the market for its own product. So until (and unless) the Supreme Court hears an appeal (or the Tenth Circuit grants a re-hearing by all seven judges) and reverses it, this is the law.

What does this mean?

This new page of antitrust law as it affects the computer industry is likely to have various effects, most of which will work to return the computer industry's attention away from the courts and back to fundamental business considerations:

- The so-called "Telex tagalong" cases will suffer -- some may quietly die, others may be settled in some gentlemanly manner such as IBM's buying a research package. Companies will certainly think longer before filing additional suits against IBM.

- The Justice Department is in a weaker position, and the IBM case could go either direction. The industry Giant, "pleased that the appeals court . . . found that IBM has not violated the antitrust laws," might try for a complete cleaning of the slate. On the other hand, it could use its new position to go for a more desirable settlement. If the trial starts on February 18, the former is probably IBM's decision; if it is delayed, the latter is most likely being negotiated.

- IBM could use this as an opportunity to move from strength -- perhaps severing General Systems Division and/or carrying out other desirable (to IBM) voluntary divestiture moves. This, coupled with IBM's continuing soft-sell advertising campaign to prove how good computers are, could pave the way for IBM to pursue the path it wants to take during the 1980s. For one thing, the FCC has ruled that IBM can't buy controlling interest in CML, but could go ahead and establish a separate subsidiary to put up a communications satellite.

Other mainframers would breathe a sigh of relief to know that IBM won't be split into several effective competitors. And, IBM's competition may move from those with a hardware, copycat approach to "plug-neutral" products that use microprocessors to adapt new product ideas to existing mainframes. The computer industry may well be entering an era of fundamental change. Time will tell.

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DEC AND COMPUTER AUTOMATION BREAK OUT NEW MINIS
OTHERS FINE TUNE THEIR PRODUCTS . . . LOOK OPTIMISTICALLY TO '75

"Starting this month, the price of low-end computers will never be the same."

--from a DEC ad for OEM trade publications

". . . they continue our chain of uninterrupted new product announcements -- which is very bullish for us individually."

-- VP from Computer Automation

The DEC advertisement mentioned above first ran in November . . . but it was this month that the minicomputer leader chose to ripple the muscle behind its pitch. The company announced three new products -- and while officially scoffing at connections between System/32's debut and DEC's timing -- they were tagged with prices designed to catch the eyes of a whole new bevy of computer users . . . from first-timers wanting a standalone mini to big companies with a need for what can be used, in DEC's terms, as a "brilliant terminal."

To competitors' chagrin, the prices were low enough -- starting at $7900 -- to continue a trend begun last summer with price cuts on the PDP 11/05 that spread to other DEC products during the fall. And while DEC talks of dropping costs, high-volume production, economies of scale, and the history of the minicomputer's price performance . . . others mutter price war.

Meanwhile -- on another coast -- Computer Automation sought the limelight with a shotgun expansion of its product line . . . minting in the process even more terms for the mini industry lexicon. CA -- whose people brought us the "Naked Mini" -- clearly expects the public to accept its new "Naked Milli," "Mega-Byter," and "intelligent cable" with imbedded "pico processors." As the company spokesman quoted above indicated, CA is banking on the new products to increase its market share and buttress earnings against the sagging general economy . . . a sag mirrored by two quarters of decline in Computer Automation's earnings.

Against that backdrop, January saw other forces in the industry active, each according to its own "game plan" -- enhancing, tweaking, adding, or otherwise beefing up products. And whether it was Interdata plugging its first miniperipheral (a carousel printer -- see page 8) into its product line, Data General issuing software for the Eclipse, or NCR tacking a floppy-disk system onto its NCR 399, progress industry-wide continued apace.

"Sure we've seen softening in certain areas of the market," came the message to EDP/IR in telephone queries to the mini houses, "nobody's unaffected by this recession. But relatively speaking, we're feeling it less than most -- orders are still coming in at a good clip, backlog is heartening."

Growth for the next year may not be as volcanic as in the past, and some companies will have to belt-tighten more than others to rescue earnings from the recession, but no cataclysmic skaheout is predicted. And technological innovation -- the major source of the minicomputer industry's Brownian motion -- seems to be proceeding with the usual elan.

If not a boom year, 1975 looks far from bust.

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The DEC trio

Although three products were announced, each is a variation on the PDP 8/A theme and comes with a VT50 DECscope, standard keyboard, and a dual floppy-disk system with minimum store of 256K characters each. (The operating systems take up about a fourth of one disk). Memory, software, and peripherals -- all manufactured by DEC -- vary; options, including communications, are available at extra cost. Small and compact, the systems plug into ordinary wall sockets and are easily moved about. And if some significant bugs get worked out by first shipment time in May, the systems will have available electrolytic copiers that work directly off the CRT!

Briefly, DEC's three latest product offerings:

- CLASSIC: an interactive classroom computer. With 32K words of main memory and an operating system called OS/8 that works with BASIC (Fortran IV optional at $700), CLASSIC is geared for use in computer-aided-instruction . . . either as a tool for programmed learning or in promoting "computer literacy." Currently, two software packages are available -- a "Curriculum Package" for instruction and resource, an "Application Package" for programmed learning -- each at $395. CLASSIC's price is $7900, and won't be discounted.

- CMS/1: an engineering mini. Also with 32K words of main memory, CMS/1 operates standalone or as a remote job entry terminal. It has Fortran IV capabilities and performs a certain number of preprocessing functions . . . its primary role, though, is that of exotic, programmable calculator. CMS/1 costs $12,000 with discounts for OEM buys.

- Datasystem 310: a business computer. This is the $12K bottom entry in the DEC Datasystem 300 product line . . . and can be used standalone or, as mentioned, as a "brilliant terminal." Main memory runs from 16K to 64K words, a variety of printers is available, and an optional 2780 communications interface can be added as well as a second disk drive. The operating system, COS-310, is a subset of that used on the bigger DECs, DIBOL is the application language. Software and hardware are upward-compatible. OEM discounts are available.

Although the possibility of CLASSIC catching on in the hazy environs of computer-aided-instruction are intriguing (visions of high school kids queuing up in bookstores to buy floppy disks) . . . and the straightforward CMS/1 should have reasonable success . . . System/310 is the main attraction.

To promote the new system, DEC developed a double-edged marketing plan. First, for snaring first-time users, the company has assembled a loose network of 32 OEM outfits willing to market the system -- and link with the prestigious DEC name. The OEMers will do the basic "hand-holding" for the new users, but DEC will still service the hardware. These OEM outlets ("Franchise isn't really the right word") are typically systems packagers and service organizations with a software bent, and the basic value-added will be in applications software. One such firm contacted by EDP/IR said it would offer the Datasytem to new users at the purchase price announced by DEC; also, full pay-out leases will be available. For standard applications programs, which the company hopes to market elsewhere sans hardware, it will charge another $1200 to $4000. Asked how it drummed up business, the company said most of its customers were referred by DEC.

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Second parry in the DEC thrust is through the EDP departments of large companies. . . companies that might find the terminal capability attractive and, unlike first-timers, are computer savvy. In essence, the in-house staff -- with some help from DEC -- acts as its own systems house. DEC expects equal sales from both marketing channels.

What about System/32 and the 310? To an end user face to face with a DEC machine with applications software added by that OEMer, the similarities are there: The floppy disk, the lack of punch cards, portability, house current power, etc. And although DEC spokesmen complained of the apples-to-oranges fallacy in comparisons between the two machines, they were quick to point out the price difference. Even with the cost of software added in, it's still less than half. System/32, counting software start-up, costs $33K to $40K. So with IBM salesmen beating the bushes for just five initial industries (EDP/IR,Jan.20,1975), DEC types might be aided in their offerring of specialized, tailored adaptations of the 310.

Blitz from Computer Automation

And blitz it was. Four products were announced at once, together representing Computer Automation's continuing efforts to expand and strengthen its product line . . . which could use the bulwarking. In part due to the low component costs of its goods, and their OEM emphasis, the CA line seems, to date, more vulnerable than most to the vagaries of recession.

Two of the products, balanced on either end of the product line, are processors, one is a software release for making OEM production of applications software easier, and the last is a distributed I/O interfacing system for linking any of CA's LSI series processors to its peripherals. Now the company has a product line stretching from the micro-mini DMZ to the limbo between minis and general-purpose computers.

The CA line-up:

- The Naked Milli: a tiny 16-bit processor, upward-compatible with the rest of the LSI series, costing less than $300. Its instruction set is a subset of the Naked Mini's, programs on the Milli can run on the Mini, and the Milli can use some of the same peripherals. The 7" x 15" bipolar MSI half-card is electrically and mechanically interchangeable with its bigger siblings. According to the company, the Naked Milli's drawing card is its instruction set, its powerful I/O structure, and, especially, its upward compatibility with the bigger CA machines.

- The MegaByter: a hefty 16-bit mini in the PDP 11/45 range, with a memory capacity from 32K bytes to over a million bytes, and costing from $10K to $110K, depending on the memory configuration. All hardware features and software of the smaller LSI machines, are supported by the MegaByter. A set of 224 microcoded instructions provides for hardware stacking, string arithmetic, direct bit manipulation, and other functions usually requiring software subroutines. CA sees its jumbo mini being used in data communications, business applications, and as controller in larger data systems.

- Fortran IV Compiler: a compiler for OEM use in generating system applications, operating in a DOS configuration with at least 16K words of memory. It runs on any of the LSI series with disk.

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- Distributed I/O System: a single half-card I/O distributor, attachable to up to eight cables with tiny processors ("picoprocessors") imbedded in them . . . for linking with a variety of peripheral devices. Operable in a series mode or parallel mode, the "intelligent cables" bring the concept of microprogramming to I/O control. CA says the product reduces OEMer I/O interfacing costs significantly.

Le Grand Mal

In its minicomputer fall roundup (Nov.6,1974), EDP/IR tested the attitude of the minicomputer manufacturers toward the deepening economic lassitude . . . and found them almost surprisingly optimistic for 1975. The industry as a whole was coming off a pretty good year: 1974 shipments should register above $1 billion for the first time when the results are in.

Estimates for growth during 1975 were typically in the 25% to 30% range through the fall. But the recession seems to be slumping toward the worst-possible-case posture, and preliminary user/vendor surveys by IDC, publisher of EDP/IR, indicate that these estimates may have to be revised downward closer to 20% (year-end figures to be published soon). How do the mini makers view the future now?

They are still optimistic. "I hate to say it," confided one company official, "but we seem to be, well, sort of making out in this mess -- knock on wood." He was referring to the fact that the industrial sector of the market was responding to the crunch by, among other things, automating to cut labor and inefficiency costs -- meaning more minis.

Others felt that they were in good "field position" for an onslaught of lean times. As an Interdata executive put it: "We think we're in good shape. We may not grow as explosively as in the past, but we have our products out -- especially the 7/16 and 7/32 minis -- and sales and orders for them are better than anticipated. We think it makes a difference if your new products are ready before a recession, rather than after it. They weren't the last time, and we felt the crunch a lot worse."

And when it comes to grooming product lines for defense against the squeeze, Miniland is a-jump. New products are being pushed and old ones enhanced, advertising campaigns are picking up bite.

DEC, for instance, besides the three new PDP 8/A derivatives will introduce a monster PDP 11 (the 85?) next month . . . Data General has voluminous software packets ready to go out with Eclipse shipments in March . . . Hewlett Packard is loudly hawking its end user system, the M/280 Sales Order System based on the HP 21MX . . . General Automation has added two new low-end minis to its DM 100 family of commercial systems . . . Varian has put together a turnkey OEM message-switching system out of V 70s, marking the company's first effort in systems packaging . . . Interdata has its first in-house miniperipheral, a printer with a microprocessor in it (see Newsfront) . . . Texas Instruments is rumored to have a mini in the mill . . . IBM is making the System/7 more palatable for commercial use with attachments unveiled with the System/32 and maybe more to come . . .

. . . and so it goes. "Sure I'm worried about the economy" said one company executive in an unintentional State of the Industry Address, "but from a personal standpoint, not the company's. Things look relatively good here. And if those guys in Washington could ever get their stuff together . . . ."

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• ROUNDING OUT ITS SERIES 60, HONEYWELL has announced two new computers: the small Model 66/10 which drops Level 66 down a notch into the medium scale price range, and Model 68/60 which maps the advanced features of Honeywell's showcase operating system, MULTICS, onto a smaller hardware configuration than the 68/80. The two systems chink the gaps left when HIS introduced the Series 60 less than a year ago (EDP/IR, April 30,1974).

Model 66/10 utilizes MOS main memory (328K to 524K bytes), has a cycle time of 1.4 microseconds for eight bytes, and comes with microprogrammed peripheral processors. A DATANET 6600 Front-End Network Processor handles dialog between the CPU and its peripherals or satellites. The basic cost on a five-year lease could be as low as $13,400; monthly bill on a typical system about $20,000.

Estimated at having two-thirds the processing power as the 68/80, the Model 68/60 rents for about that, too, starting at $46K and typically running something under $100K. For the money, a user gets built-in virtual storage, sophisticated hardware and software security features, and multiprocessing capability with up to two CPUs and 4 megabytes of memory. It's all part of what Honeywell calls the "MULTICS environment."

Not mentioned by HIS was the fact that the Model 66/10 got the nod for development and introduction over a high-end Model 64 -- manufactured by Honeywell Bull in France. The question is whether or not that corporate decision is some of the fire behind the smoke that's causing rumors on the continent . . . rumors that Honeywell's French subsidiary is ailing, perhaps terminally, or is up for sale.

• TURNING OVER STONES IN EVEN THE REMOTEST OF PLACES is Ma Bell, this time taking a swipe at her critics in "The Bell System Technical Journal." Occasion for the mini-polemic was the marking of Bell Labs' Golden Anniversary. The technical arm of AT&T has been tilling its wizards for fifty years this month. Said Bell: " . . . our spectacular progress is largely the result of the close ties among Bell Laboratories, Western Electric, the Operating Telephone Companies, and the AT&T parent company, and is not an independent phenomenon."

• CHIPPING INTO THE REVENUE POT AT CAMBRIDGE MEMORIES will now be its first semiconductor offering -- a 1K RAM, n-MOS type with a complete read-write cycle time under 200 ns. The chips will first be used in IBM and DEC add-ons made by Cambridge and are being made available in evaluation quantities for under $10. According to the company, this chip is just the beginning of a family . . . and that costs could drop as a result of the in-house wielding of new technology.

• GETTING INTO THE SEMICONDUCTOR GAME ALSO IS MEMOREX, which has started marketing MOS main memory for IBM 370s and 360/65s. The Memorex 6000 Series memories, as they are called, all use 1K chips from AMS and are field upgradable. The Memorex move is seen as more of an attempt to satisfy needs of its customers currently using its other plug-compatible peripherals . . . and not a major dive into the hornet's nest of the add-on memory business.

• CAROUSELLING INTO THE PRINTER BUSINESS, Interdata has introduced a Selectric-type printer with internal microprocessor control. For muscle it uses digital stepping motors, for brain the micro (with 4K of ROM/RAM available for OEM tinkering). The machine uses a removable cup (vis a vis the Diablo "daisy-petal" wheel) for printing. Starting at $1500 for the printer itself, the machine cost $2000 as a full-dress smart terminal. OEMers only need apply.

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"THE GRAY SHEET" FEBRUARY 12,1975 • VOL.10,NO.11 P.J.McGOVERN,PUBLISHER

Inside: FCC rules on IBM-Comsat; Loyalty wrap-up

BURROUGHS, NCR GIRD PRODUCT LINES IN THE WAKE OF SYSTEM/32
IMMEDIATE DELIVERIES AVAILABLE ON NEW B 700s, ENHANCED NCR 399s

Though neither mainframer would comment at the time about IBM's rude and brassy intrusion into their traditional domains and markets of long-time entrenchment . . . they didn't have to. For, within a month of the IBM announcement and shortly before the first System/32 user group was born, new products and enhancements of old ones from the IBM adversaries waxed eloquently in their stead.

There was less hoopla, of course, but Burroughs and NCR seemd to be saying "we're ready, we even saw it coming" with a trussing of their product lines in that gray area where computers end and accounting machines begin . . . where Burroughs and NCR have long been considered to reign supreme . . . and where those 75,000 System/32s forecasted to be shipped by 1980 (EDP/IR, Jan.20, 1975) could well rake their deepest furrows.

NCR was first, not with a new computer, but with the addition of disk capability to its NCR 399 accounting computer. The company itself admitted that the 399 is its most threatened contestant in the ring with the System/32 . . . and the disk adds some much needed fillip to its commercial allure.

A few weeks later Burroughs followed with four new models at the low-end of its B 700 series -- to strengthen the bridge between its L Series accounting machines to its B 1700s. The company also added an entirely new series, the B 720, at the upper end of the B 700 scale. Most noticeable advantage to the B 720s is the fact that they have data communications capability similar to the B 771 -- but can operate in a standalone configuration.

If the boundary between the world of accounting machines and the world of computers is shrouded in mist, market statistics are even more so. It is estimated, however, that in the realm of accounting machines and what are called "small accounting computers" Burroughs and NCR together command roughly 60% of a $1 billion dollar worldwide market, with Burroughs the more proliferate.

In any case, they are both prime targets for the System/32. A 1973 study by International Data Corporation, publisher of EDP/IR, on small business computers and the impact System/3 had on that and the accounting machine markets showed

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that small business computers primarily go to new user sites . . . and generally replace accounting machines. Interestingly, it also found that a certain amount of vendor loyalty existed in migrations from accounting machine to computer -- at least one factor in favor of NCR and Burroughs as they face the onslaught of the System/32 along with companies like DEC, Basic Four, Qantel, Nixdorf, et al.

Site by site, that IDC study found that small business computers installed replaced older processing methods in the following manner:

Processing Methods Displaced

	All Manual	Service Bureau	Accounting Machines	Computer
System/3	21%	17%	52%	20%
Other Mainframe	12	32	67	12
Independents	25	33	42	8

When small business computers were looked at from an applications standpoint, it was discovered that they replaced either manual or accounting machine methods of processing in over 70% of all applications. (For the sake of this particular study a small business computer was deemed one with at least 2K processor memory, capability for stored programs, some non-industry-specific software supplied by the vendor, and a cost somewhat less than $100,000.)

The biggest bite out of the accounting machine market was taken by System/3 Model 6, with 70% replacing their more proletarian brothers . . . which points the way for System/32 to do the same, only more so.

Armorplating the product

Burroughs' four new B 700s, though low-end machines, are billed to provide more memory for less and are based around the faster of the two processors — the B 711 -- available to drive the current 700s. To the first-time user they will offer: buffered I/O channels, System Control Program operating software, a Dynamic Interpreter Configuration to allocate control functions on an application by application basis, and COBOL. A variety of peripheral, I/O, and audit devices is available; memory can be up to 49K bytes. Prices range from $34K to $55K.

The new series of machines, the B 720s, come with a new Burroughs processor with a one microsecond cycle time for two bytes, semiconductor memory from 33K to 98K bytes, printers, punched card, and tape devices, and a disk cartridge subsystem and floppy disk capability. The disk controller is new, and communicates directly with main memory. Prices on the two run from $62K to $132K.

All of the new models of both series are code compatible with each other and the bigger Burroughs machines, ensuring upward mobility for the growing user.

NCR's ploy was simply to tack the same disk system available on its Century 101s and 151s onto the NCR 399. Labeled the NCR 656 disk, it's a single-spindle, dual-cartridge unit with one fixed and one removable disk. Renting for $495 a month, it costs $17,500 to buy. Transfer rate is 312,000 characters/second, access time 47.5 milliseconds. Total storage capacity is 9.86 million characters.

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WHAT'S IN A NAME?

Did you know that NCR has a new mini?

It's the NCR Century 8200, processor in NCR's on-line order entry system called SPIRIT . . . and it's similar to the 725/726 processor-controllers in the NCR POS systems. The 16-bit machine has core memory of 32K, 48K, or 64K words and comes with the same disk system now available for use with the NCR 399. Not that you can get a plain 8200 -- it only comes as part of SPIRIT or whatever other turnkey systems the company plans for the future.

But why the Century name? For one thing it's a good family name, users are familiar with it. For another, the 8200 is related to its Century cousins by some common peripherals -- and can run some of the application programs sold for use on the bigger machines. For closer blood ties, there's a 101 simulator permitting the 8200 to be used alongside current NCR systems.

NCR says: "The 8200 is NCR's first low-cost minicomputer with on-line data entry and inquiry." As for the concept of introducing systems by applications, System/32 (which lagged SPIRIT by three months), and all that . . . NCR says nothing, implying "let the SPIRITs do the talking" . . . .

NCR may also be gearing to battle the System/32 with turnkey use of its Century 8200 (see box) minicomputer, which presently anchors its new SPIRIT on-line order entry system. The company spokespeople wouldn't discuss what applications might come next, or when, but did slip in that they might be different from SPIRIT in software and hardware architecture. Possibly as the result of the new IBM product offering and some rethinking in Dayton?

Weathercheck

An advanced peek at still tentative census figures compiled by IDC for 1974 (to be published in the Review and Forecast Issue) indicates that it was good for the two. Both increased the value of their installed bases by approximately 20% -- almost twice the annual rate of the industry as a whole. And to the numbers growth, the input from small computers was dramatic. B 700s doubled their count, B 1700s did almost as well. Century 101s more than doubled, while the Century 50 population swelled about 40%.

Although these numbers don't include accounting machines . . . and small business computers provide only a small portion of each company's revenue . . . still they are important, if for loyalty considerations alone. As the annual EDP/IR loyalty studies show, users tend to stick with their familiar vendor as they expand, update, and buy more computers.

As of now, government statistics estimate that there are well over 400,000 companies in the U.S. alone with 20 to 250 employees. And considering each as a candidate for automatic data processing, computer penetration is, at the moment, only about 10%, mostly amidst the bigger establishments. For companies like NCR, Burroughs, and IBM -- with plenty of small business marketing savvy, hydra-like service organizations, and products costing the rough equivalent of just one person -- it's a fertile market . . .

. . . and, if it has to be, a spacious battlefield.

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FCC TETHERS IBM; STRINGENT CONDITIONS SET FOR DOMSAT ENTRY

In a terse, two-page public notice last month -- followed by a 40 page "Memorandum Opinion and Order" issued just two days ago -- the Federal Communications Commission turned down IBM's proposed bid to enter the domestic satellite (DOMSAT) skies in liaison with Comsat General . . . and stated rules under which either or both of the two companies might gain the heavens. The decision and resultant ground rules should do much to quell the controversy (EDP/IR, Oct.24,1974) started last July when IBM and Comsat submitted their skeletal petition.

Opponents -- including The Justice Department, the Computer Industry Association (CIA), the FTC, various common carriers, and others -- had argued that an IBM union with Comsat would give revamped CML Satellite, the joint subsidiary, too much of a competitive edge over other DOMSAT entrants . . . and IBM too much power in the data communications field.

IBM and Comsat, on the other hand, argued that somebody had to fend off AT&T up there and that they were best suited to the task. Opponents said that, under the proposal, that might not happen anyway and rebutted with scenarios that had the two giants playing a game of telecommunications "Hi-lo" . . . and splitting the DOMSAT pot between them.

The FCC heard all the arguments pro and con, deliberated, and then squelched the bid . . . but left IBM and Comsat in the game, albeit with a higher ante.

That, in fact, may have been the reason the application was so unspecific in the first place. Seen as a trial balloon, it was a success. IBM and Comsat now know where they stand in FCC eyes and in which direction they must aim to get their DOMSAT plans off the ground:

+ ". . . upon condition that Comsat General shall not offer any communications common carrier services directly to the public," it may lease space segments to IBM as it now does to AT&T.

+ Either side may enter independently, and Comsat's ground rules vary according to IBM actions. Essentially, if IBM goes it alone, the AT&T-Comsat strictures are loosened.

+ A joint venture would be approved provided "no partner shall have less than 10% . . . nor more than 40% ownership interest or otherwise be in a position where it could exercise de facto control."

In other words, the FCC is attempting to keep the AT&T-Comsat-IBM triangle an equilateral one. Comsat may not sell telecommunication services wholesale to the two monoliths and, using the substantial revenue gained therefrom, also retail to the public; CML may yet survive, but not as an IBM or Comsat General puppet regime; and AT&T competition is provided for.

Further provisions were chosen to regulate IBM's participation. "Irrespective of the manner in which IBM chooses to enter," the mainframer must 1) establish a separate corporate entity to engage in DOMSAT business, 2) permit reasonable and nondiscriminatory interconnection earthside, and 3) as parent, "not sell or promote communications services of any system in which its separate satellite corporation entity participates." Apparently those fears that IBM might monopolize telecommunications through its systems marketing were well voiced.

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The winnah is?

It's hard to tell. The CIA, for instance, which vehemently opposed the IBM-Comsat proposal, considers the FCC ruling a victory. "Not to blow our own horn," said one CIA executive, "but we feel that we -- and others like Sanders, Datran, and so on -- had a lot to do with it. We are pleased. The FCC has shown that it understands the complex situation and can react reasonably to ensure adequate competition. IBM will now have to regroup and rethink its overall posture in this matter. Yes, we are pleased." Others, like Western Union, would make no comment until they had had plenty of time to study the FCC memorandum . . . but did point out that IBM and Comsat were in no way locked out of the business.

Meanwhile, IBM and Comsat remain relatively quiet. Both must now study the options, ponder, and search for loopholes. IBM, however, did voice one reaction, and Comsat concurred with the somewhat snappish communique: "We are pleased that the Commission believes IBM and Comsat can make a significant contribution to satellite communications. There is language in the Commission's Opinion and Order, however, which gives us serious concern. Without satisfactory clarification, that language would be a barrier to IBM's entry into the satellite communications business, a result we do not believe the Commission could have intended."

As for CML itself, the company is adrift . . . in a sea that should swell to $1.2 billion worth of spending on data communications next year. MCI and Lockheed no longer have the money or inclination to pump into it; and IBM and Comsat -- who have been inputting CML coffers since last summer -- may decide to strike out on their own. What happens next is up to them, the big boys.

\+ + + +

Loyalty wrap-up!

INDUSTRY LOYALTY PROFILE: IBM GAINS IN NUMBERS ACROSS THE BOARD
BUT OTHERS WIN IN DOLLARS IN BIG MONEY CATEGORIES

As the final segment to the latest annual vendor loyalty study, EDP/IR presents the loyalty breakdown by industry classification (SIC) . . . and once again users showed strongest fealty to the Giant. By site count at single-vendor sites, IBM made a clean sweep, beating its competitors in every category. Especially strong showings were marked in some of computing's biggest circles: Industrials, Finance and Insurance, and Computer Services to name a few.

But by value, the situation was reversed. For the most part, the "other" mainframers not only registered higher dollar loyalty, but also showed the most gain from year to year. Strong suits here were in Wholesale/Retail, Durable Products, Educational Institutions, and Chemicals.

Overall, the picture fits with that reported in the EDP/IR of Dec.18, 1974, where IBM won the loyalty crown -- but Burroughs, NCR, Honeywell, and Univac generally edged the Giant out when it came to dollar loyalty or competitiveness (by dollar or site count). That finding seems to hold true pretty evenly throughout the major industry classifications.

As in previous years, the industry profile concerns only single vendor sites installing a computer during the argument year. Extensive spot checks of data from multiple vendor sites indicate that -- by dollar and by count -- the trends resemble those affecting single sites, though perhaps less pronounced.

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Cracking the code

Tabulations of vendor loyalty by industry classification are presented on the opposite page . . . and understanding them is not as scary as it looks! Limitations to the overall study, once again, are these:

+ Only general purpose, or Group A, computers installed at U.S. sites have been considered. Also only U.S. vendors. Minis, terminals, independent peripherals, and so on -- even though a certain type of loyalty may be implied in their purchase -- are not included.

+ Figures may be based on either the number of sites or the value of all systems on hand at that site, *not just the one installed that year.*

+ Equipment acquisition method is not considered, so a user buying or renting from a third party is not considered disloyal.

+ New sites and therefore entry-level business are not considered, only sites previously having a computer.

As for deciphering the table itself, a few simple rules should make it a bit easier. Just remember:

- It's IBM versus all other mainframers lumped together. Numbers to the left of the slash marks represent the Giant, number to the right represent the other computer makers.

- Figures based on numbers of sites are in straight type, figures based on value of equipment are in italics.

- A loyal site (L) is one which got a new system from its current vendor. A disloyal site (D) got a new system from a competitor. The sum (L + D) therefore represents the customer base a vendor had at the beginning of any single year. Percentages are derived from there.

- Dollar loyalty is based on two values:

  (1) The value at the beginning of the year of all equipment on hand at all sites where a vendor was present (L + D).

  (2) The value at the end of the year of all equipment on hand at loyal sites (L).

The reason for dollar loyalty is this: in previous loyalty studies if an IBM user, for instance, should install a new -- but smaller, less expensive system -- he would register as loyal, even though IBM lost revenue on the deal. But with dollar loyalty, consolidations, downgrades, and other previous intangibles are depicted in the growth in value of a vendor's loyal base.

Note from backstage: Burroughs had the most enviable record when it came to bumping a rival vendor, especially those ensconced in factories, wholesale/retail establishments, and service bureaus. NCR looked best in transportation/utilities and wholesale/retail, weakest in industrials and educational classes. Univac's forte was on the campus and in the financial institutions, HIS in industrials, government, and computer services. IBM, of course, was everywhere.

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SINGLE VENDOR SITES
INDUSTRY LOYALTY PROFILE
(Copyright 1974 -- International Data Corporation)

		Loyalty (%) IBM/Non-IBM			Dollar Loyalty X 100 IBM/Non-IBM			Sample Size (1973) IBM/Non-IBM	
	SIC	1972	1973	1974	1972	1973	1974	#Sites	Inst Value(M)
Agri.,Mining, &Const.	01-17	86/57	92/78	89/88	*98/64*	*99/95*	*105/115*	48/18	*$43/$10*
Chem. &Petro. Proc.	20-31	94/68	95/71	96/86	*102/124*	*97/110*	*112/139*	400/94	*$360/$76*
Durable Prod. Manuf.	19,32-39	91/85	94/83	97/83	*105/119*	*111/126*	*129/151*	476/193	*$395/$218*
Transp. &Utilities	40-49	97/88	97/85	98/83	*108/96*	*121/117*	*117/170*	144/46	*$312/$74*
Wholesale/Retail	50-59	93/83	92/85	94/78	*110/119*	*114/129*	*132/150*	296/126	*$191/$136*
Financial &Insurance	60-69	96/83	97/80	98/93	*101/112*	*102/127*	*114/72*	407/158	*$696/$186*
Non-prof. Services	70-79	88/100	90/100	100/SS	*122/125*	*137/100*	*82/SS*	20/7	*$17/$9*
Health-Hospitals	80	90/73	95/74	96/95	*109/74*	*125/97*	*147/137*	78/31	*$46/$19*
Colleges &Univ.	82	82/57	81/75	88/71	*80/105*	*109/145*	*132/92*	135/32	*$119/$37*
Computer Services	89,73	95/79	97/86	97/84	*106/96*	*119/115*	*135/125*	265/94	*$335/$274*
Federal Gov.	91	75/100	100/89	100/100	*119/61*	*110/116*	*108/117*	11/9	*$39/$48*
State Gov.	92	93/83	96/83	100/SS	*122/109*	*114/112*	*126/SS*	46/18	*$71/$55*
Local Gov.	93	84/76	90/75	86/71	*121/113*	*123/131*	*150/129*	118/53	*$83/$44*
Unknown	XX	94/63	97/53	92/SS	*80/79*	*113/86*	*143/SS*	29/17	*$29/$11*

Loyalty (%) = L/(L+D)

SS = Sample too Small

Dollar Loyalty (X 100) = $\frac{\text{Year-end Value Installed Base of L}}{\text{Year-begin Value Installed Base of L + D}}$

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• IF QUARTERLY FINANCIAL REPORTS COULD SIGH, surely the one released by Telex Corporation for the period ending on December 31, 1974, would have. Although the company squeaked by in the black for the quarter, total revenues were down over last year, and the Computer Products Group -- the meat and potatoes portion of the Tulsa firm -- again operated at a loss.

In the report, and in a news release printed two days earlier, the company vowed to continue its legal fight against IBM and pointed out that no judgements are binding until all appeals are exhausted by both parties. And, as if to underscore a statement in the report that "there can be no assurance that the level of sales can be maintained in future periods," Transamerica Corporation, whose leasing subsidiary has mostly Telex gear in its portfolio, reduced by $13 million the carrying value of that equipment. The tax reserve thus set aside dropped Transamerica's reported net income of 1974 from $53 million to $40 million. Transamerica, however, was not deterred from continuing its own antitrust suit against IBM.

And finally, in a related development, the IBM-Justice Department case was set back a month or so because of snafus encountered in readying documents for trial. They were scrambled during the copying process and the mess is so bad that even the lawyers in the case have been put to work sorting them out. The delay, so close to the Telex reversal, has sparked rumors that there is more than just Humpty-Dumptying going on.

• SPERRY AND SAAB-SCANIA PLAN A JOINT VENTURE IN SCANDINAVIA, according to an agreement in principle signed by the two companies last week. The joint firm will market and service Sperry and Saab-Scania equipment in Denmark, Finland, Norway, and Sweden. Not included will be small computers, terminal equipment, and equipment of an autotransaction nature in the Data-Saab line. The joint venture is expected to become operative as early as April.

• BELL TELEPHONE CALLED FOR DISMISSAL of the Justice Department suit against it in a 24 page filing with the federal court in Washington. Crux of the call was that "The current complaint is plowing the same old ground," according to the company's general counsel. AT&T claimed no violations of the previous consent decree, no competitive acts, and no reason to sunder the status quo.

• KEEPING IN CHARACTER ARE SCAN-DATA AND SCAN-OPTICS, two U.S. makers of OCR equipment announcing new models recently. From the latter come three new systems covering a broad range of speed, processing capability, and price. The two bigger machines scan at a rate of 2000 cps and rent for $4300 to $7000 a month. Scan-Optics claims to have developed new recognition technology that greatly increases reading accuracy. As for Scan-Data, its new offering was billed as a low-cost system for smaller-volume computer installations, aimed at the same marketplace as the IBM 3886 reader. Rental on a three-year lease for the Scan-Data machine, called the 2250/1 OCR System, is $4K a month.

• TYMSHARE IS OUT OF THE COURTS WITH A SUMMARY JUDGEMENT AND DISMISSAL of the case brought by Allen-Babcock Computing, Inc., when Tymshare reneged on a deal to purchase the plaintiff company. Compensatory damages looked for had been $3,160,000 with punitive trebling. The lawsuit was dismissed without prejudice.

• THE IBM SYSTEM/4 PI? It's a new general purpose military computer displayed by IBM at the annual Navy League Show in Washington last week. State-of-the-art features: microprogramming, 32K store, LSI production, fast data fetch, and more.

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INTERNATIONAL DATA CORP
6 1975

EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" FEBRUARY 27,1975 • VOL.10,NO.12 P.J.McGOVERN,PUBLISHER

IBM FLEXES DEFENSES; STRESSES INDUSTRY COMPETITIVENESS AS PRETRIAL BRIEF IS FILED, DOJ CASE MILLS SLOWLY TOWARD BEGINNING

"Today, computers are blinking away on assignments that weren't even contemplated a few years ago. As recently as 1953, there were only a few companies making computers for a limited number of uses -- and just a handful of customers. Now, there are dozens of competitors and thousands of users -- each looking for new ways to put computers to work."

-- from an IBM ad campaign for public support reported in EDP/IR, June 14, 1968

"The electronic data processing ("EDP") industry and IBM have delivered greater product performance and price reduction to consumers, and have delivered them faster and more consistently, than any other industry or company in the history of this country. As a direct consequence, our nation has achieved a significant scientific and industrial advantage in such fields as atomic energy, space exploration, weapons systems, and, even more importantly, all forms of automated production, accounting and analysis. . . ."

". . . Destruction of competition and harm to the consumer are thus not an unfortunate, indirect by-product of a necessary attempt by plaintiff to enforce the law. They are rather the direct result of plaintiff's view of the law: that success itself must be punished -- and the consumer be damned."

-- from the IBM "Introduction and Summary" in its pretrial brief of January 15, 1975

The stage is set. And the Halls of Justice, as they preside over an audience of lesser civic buildings and the hustling traffic that fills Foley Square in Manhattan's south end, are hushed. But the walls of the U.S. District Courthouse there, ponderous and massive, may soon be ringing . . . to the opening of a certain anti-trust suit, also ponderous and massive. The biggest, in fact.

Except for the well-publicized snafu that left thousands of documents scrambled and nearly destroyed in their readying for trial, the case could be underway by now. Although much discovery and deposition-taking remains -- especially in relation to an amended complaint covering the defendant's actions subsequent to the suit's beginning in 1969 -- the Justice Department case is in.

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The defendant, International Business Machines Corporation, eighth largest company in the nation, is also ready for the clash.

IBM's defense, as it is laid out in a 374-page, slickly-printed pretrial brief that comes complete with color pictures and graphs, will center around one main contention: That IBM's success comes on the basis of its merits. In colorful and sometimes jackhammer prose, the industry giant weaves the message throughout the brief that the computer industry is competitive, that IBM's actions were normal competitive ones, and that size alone does not make a monopoly.

Indeed, it is Judge Edelstein's own opinion, issued in July 1973, that the brief so often quotes: "The concept of monopoly power is a complex one . . . Market share is no talisman that alone determines whether a defendant has monopolized an industry."

The charges

Point to the well-packaged counterpoint of IBM's pretrial brief is that of the Justice Department. Submitted to the court on October 17, 1974, it may be more pedestrian in form and style than the IBM response . . . but it still makes for interesting reading. Its 338 pages are collated out of the sheaf of private antitrust suits that litter the industry's past from the advent of the IBM 360 on. For the most part, the victims of IBM's alleged illegal conduct have, at one time or another, petitioned for legal redress against the Giant. Some settled out of court, some lost, and some are still in front of a judge.

Specific allegations of the Justice Department come in two parts. First that IBM has monopoly power, second that IBM has wielded that power. After defining the relevant market that IBM has dominated as that for general-purpose digital computers ("The Systems Market") and their extensors ("The Peripheral Equipment and Terminal Markets") the DOJ goes on to show IBM's dominant power in them. To show it, the Department cites:

+ IBM's internal statistics and its later attempts to impeach those same statistics, admissions from IBM officials, depositions, and independent statistics.

+ IBM's power over price, including the "price umbrella" or the price difference that competitors must exceed, and IBM's use of pricing alternatives as a competitive weapon.

+ IBM's power to exclude competition, with mention of GE's and RCA's demise in the computer industry; IBM's power to set de facto industry standards; and the barriers to entry that exist as a result of IBM's industry power and sheer company size.

Then, to show that IBM used this power -- demonstrating the "intent to monopolize" that is a crucial aspect of the Sherman Act -- the Department of Justice alleges misconduct in the form of:

- Bundled pricing. IBM, by use of one price for the entire package of hardware, software, maintenance, and support unlawfully maintained its market dominance, created barriers to entry and growth (primarily through the establishment of high purchase-lease multipliers that served to increase the capital intensiveness of the industry).

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- Fighting machines. Including the entire 360 line and some that never made it (remember the 360/64?), the introduction of these machines restrained "the entry, growth or success of its [IBM's] competitors." Characteristic of these machines are premature introduction and/or low expectations of profit.

- Educational allowances. Through discounts to select universities and colleges, IBM sought to increase its industry dominance . . . at the unlawful expense of competitors. The varying discounts are deemed marketing ploys -- not corporate altruism.

- Peripherals. IBM consistently maneuvered to maintain a stranglehold on the market for peripherals to its own machines. Included are disk drives, tape drives, add-on memory, and terminals. Specifically the introduction of the 2319 disk drive as a warmed-over but lower priced 2314, the 3420 tape drive as a warmed-over 2420, also with a lower price, and the fixed term lease plan were all devised to unlawfully limit the success of competitors.

The answer to charges

Throughout the DOJ brief, the computer industry is portrayed as a young and rapidly growing one . . . and IBM is portrayed as a dominant force plotting and acting to constrain and direct that growth along its own predetermined path. IBM

IBM argues that it is a myopic view:

"IBM's success is not due to any violation of Federal Law. It is an achievement based upon the skill and hard work of thousands of IBM employees at all levels of the Corporation. It is the natural consequence of superior effort and competition in a free and evolving marketplace."

To support this assertion, IBM marshalls legal precedents, statements from the Government's own witnesses, admissions from competitors, and quotes from the DOJ brief itself to assail the opposition's basic premises. The facts are not so much in dispute. But to IBM there's an unavoidable need to look at monopoly from the consumer's point of view . . . and an unresolvable contradiction in citing IBM's reaction to competition as proof of an industry's noncompetitiveness and the monopolization it would measure.

While the DOJ brief seems to focus tightly only upon IBM's actions since the salad days of the 360 through the early days of the 370, IBM's brief shines a much broader beam. In it the computer industry isn't composed of only eight or nine mainframe makers . . . *but all those who offer the consumer some form of data processing, as long as equivalent processing occurs.* IBM asserts that it is a question of who competes with whom . . . and provides an answer that pits mainframers against service bureaus against minicomputer manufacturers against third-party lessors and so on. The instruments that ply the market IBM feels is relevant are not so much boxes manufactured by mainframers . . . but all the functions for computing, for processing data, from which a customer may choose.

And if that's a broad context that the IBM lawyers scribe, still it finds reinforcement in the triumvirate ruling out of Denver last month. If Judge Edelstein -- or perhaps someday the Supreme Court -- agree with the legal reasoning in the Telex reversal, then IBM may have a point. (Continued on page 7)

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IBM'S TURN TO SPEAK

It's here in the pretrial briefs that litigants take the wraps off their legal offenses and defenses . . . and the machinery that looms behind IBM's is formidable. The Government's case against the mainframer is outlined in the preceding pages and is well-covered in substance in cases reported by EDP/IR over the years. For that reason we don't feel the need to quote at length the prosecution's arguments.

But the Giant rarely speaks, and when it does it's news. While we don't expect to do justice (no pun intended) to the comprehensive defense presented by IBM in its brief, still readers should have a chance to get the feel of the prose, test its flavor . . . and hear IBM -- in its own words -- respond to its accusers. Out of context and literary flow surely, here are some verbatim quotes (except for the headings) and, we hope, the gist of it all:

Deviation From The Precedent

. . . First, plaintiff asks this Court to adopt a wholly fictionalized approach to market definition. Its entire claim of monopolization hangs upon its attempt to sell this Court the preposterous proposition that only eight or nine companies compete with IBM -- an argument which Government officials knowledgeable in EDP have dismissed as a "myopic mythology" p.6

. . . Second, plaintiff's claims of monopolization ignore the many economic factors courts have always applied in assessing the competitiveness of an industry . . . Plaintiff seeks to ignore those factors because it knows their study, in light of past precedent, will prove fatal to its claims p.7

. . . Third, plaintiff deviates from past precedent in claiming that competition on the merits in the form of new product development, superior service and price reduction is a violation of Federal law p.10

. . . Fourth, plaintiff completely ignores -- and urges the Court to ignore -- the reasons for IBM's success. . . . The reason for plaintiff's silence is, we submit, that it knows that IBM's success is due to none of the acts complained of. It is due -- and plaintiff also knows this -- to extraordinarily successful product development (particularly the IBM 360 series, which revolutionized the EDP industry), and an unstinting commitment to standards of excellence in serving customers needs p.11

EDP History

. . . The necessary EDP technology and know-how was largely located in governmental and educational institutions and was equally available to all. All of these companies [a list of twelve] in 1952 had the opportunity to establish major positions in EDP. Obviously any which could have foreseen the growth of EDP in the next 20 years would have seized the great opportunity p.23

. . . Someone has said that if man's ability to fly had developed as fast as EDP we would have reached the moon a week after the flight of the Wright brothers at Kitty Hawk p.33

. . . This brief review of the industry shows that in the course of its dramatic progress, many companies have achieved very great success and some have dropped

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by the wayside. So it should be. In any competitive process, particularly in the competitive process in this industry, where the risks and rewards are so great, there are and must be winners and losers p.41

IBM's Success

. . . IBM has achieved extraordinary success in the EDP industry. IBM took very great risks to achieve that success. With the benefit of its "20/20 hindsight," plaintiff seeks to demean these risks. The true magnitude of risks earlier taken is often difficult to recapture after the risk has been rewarded with success. Perhaps the fallacies of plaintiff's hindsight are most clearly exposed by recalling that many of IBM's competitors at various times believed the risks too great or by asking who can with certainty today describe the next successful generation of EDP equipment p.41

. . . IBM has been successful because it has conducted its business in a fundamentally different fashion from its competitors. IBM has a unique and intense commitment to its people, to its customers and to the electronic data processing industry p.42

. . . IBM foresaw in the early 1960's the promise of a compatible line of computer equipment. IBM proceeded to "bet the company" on System 360. That gamble paid off and IBM is where it is today because of its internal expansion in response to customer demand for that equipment. Other computer manufacturers could have made that decision and taken the risk. None did.

Now IBM is "betting the company" today on its development of a new computer generation. If IBM is right, it will reap substantial competitive advantage and further success. If it is wrong, its customers will beat a path to those competitors who offer a better solution for their EDP needs p.44

Relevant Market/Market Share

. . . It is critical to plaintiff's claim that this Court ignore economic realities and, instead, satisfy itself with a fictional numbers game. . . .p.51

. . . It is undoubtedly unique in antitrust history that the Department of Justice could not name the sellers or products in its alleged market when the action was brought and cannot do so six years later on the eve of trial. Lawyers and economists for plaintiff are still scurrying around the country pulling companies and products in and out of their "market" in the hope one or another of the many they have posed . . . will congeal in some meaningful way . . . . p.52, footnote

. . . Where Section 2 [Sherman Antitrust Act] has been applied in the past, the Court has been confronted with the defendant's virtually exclusive control -- for decades -- of an entire industry. The high share proven in these cases did not depend upon the artful carving of "markets" and "submarkets" [or as IBM calls them elsewhere, "subsubmarkets"] from some broader industry . . . In each case, the court was confronted with a recognized industry of indisputable significance -- aluminum, cigarettes, shoe machinery. In each case, the court was confronted by a dominion of great breadth and long duration which clearly indicated that the competitive processes . . . had ceased to function. Those situations stand in stark contrast to the economic realities of the EDP industry . . . p. 223

[IBM then reviews the market share breakdowns resulting from the parties' joint census] . . . To summarize the preceding in tabular form:

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IBM Market Share

		1957	1972
(i)	EDP companies deposed in Census :	55%	32%
(ii)	Top 100 EDP companies deposed in Census :	56%	37%
(iii)	COMSTAT (Categories A through Z) :	59%	39%
(iv)	EDP revenues of more than 90 EDP manufacturers deposed in Census which offer complete general purpose digital computer systems :	61%	46%
(v)	COMSTAT (Categories A through L) :	74%	51%
(vi)	COMSTAT (Categories A through G) :	83%	59%
(vii)	Companies identified by plaintiff in its answer to Interrogatory 5(e) as having manufactured general purpose digital computer systems :	72%	49%
(viii)	Plaintiff's nine companies :	83%	63%

. . . ps. 228 & 9

Fighting Machines

. . . First, IBM is accused of launching so-called "fighting machines." What is a "fighting machine"? Plaintiff never clearly says p.56

. . . Stripped of plaintiff's inflammatory verbiage, this accusation boils down to an incredible "charge" that IBM developed, manufactured and marketed new and improved products in response to customer needs and competitive efforts . . . p.57

. . . One of the curiosities of plaintiff's practice claims is that they often deal with practices outside the relevant market which plaintiff asserts to be monopolized. Thus, plaintiff denies IBM's Models 44, 67, or 90 are general purpose computers . . . . p.57, footnote

Bundling

. . . In some respects this section of plaintiff's trial brief smacks more of serialized fiction than legal analysis p.60

. . . Plaintiff does not claim that IBM should not have offered the "bundle" or that it was unlawful in and of itself. Instead, it appears that the claim is that at some point in the 1960's -- when is unspecified -- the "bundle" or some part thereof -- also unspecified -- became unlawful. Like most writing that uses the format of fiction, the purpose is to induce the reader to carelessly accept a view of things which is not real. The facts about the bundle should not be in dispute and do not need coloring to be understood p.60

. . . Surely, IBM's single-pricing practices cannot be deemed a Federal offense, where plaintiff concedes they were justifiable when adopted, where plaintiff required IBM by Court order to extend that practice and where IBM moved voluntarily

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to change these policies promptly, after consultation with plaintiff, when changes in the character of the industry suggested the reasonableness of such a change.

Yet, plaintiff now asks this Court to condemn as illegal a practice which was essential to the growth of the industry and admittedly met a "clear need" of the user. Plaintiff's attack is based wholly on unsupported speculation that those practices had certain alleged anticompetitive effects. . . . p.336

Educational Allowances

. . . What justification does plaintiff advance for asking the Court to condemn these educational policies which the Federal Government so ardently pursued a few years back? In an apparent effort to avoid dealing with the objective facts of IBM's educational support programs, plaintiff resorts to the most blatantly disingenuous distortion of IBM's documents and to what can only be described as mindless name calling.. . . . p.66

. . . As in other parts of its brief, plaintiff appears to believe that it can transmute legitimate socially desirable conduct into a Federal offense by proving those practices were shaped in part by competitive considerations. That is nonsense. . . . p. 368

. . . For a company which allegedly possesses such vast monopoly power, IBM was remarkably ineffective in its alleged campaign against CDC and SDS, both of which have experienced extraordinary growth throughout their history. . . . p.370

\+ + +

Justice retrograde?

EDP/IR finds the latest trial delay disheartening. Here is a case that has lumbered on for years like a Brontosaurous through the swamps, heavy and slow, until the eve of trial . . . and now a score of lawyers work overtime shuffling thousands of mixed-up pages while justice circles. It's a striking vignette.

And time may well be the DOJ's most ruthless foe. After a while in such a long drawn out affair, a certain entropy must take hold. Memories dim, papers dissemble, staffs turn over, expertise dissipates, and motivations flag.

Now, with Telex such a recent and satisfying victory for IBM and the mismatch of legal resources to count on, IBM may be emboldened. Rather than "cop a plea" in the form of a consent decree, the industry giant may move to clear its name and burn off the fog of litigation that surrounds it.

We shall soon find out. And whether it's to be a consent decree or the long protracted ordeal of trial, the future of the computer industry will be inextricably linked with that of IBM. In the company's own words:

> *"IBM innovates, competitors threaten, IBM reacts, competitors react in turn and IBM reacts again. Each action or reaction described is a better product or lower price. This is not the 'quiet life' of a monopoly but the very essence of competition."*

It's from the book. Now the question the Court must decide upon -- or the litigants agree to -- is whether or not the book is fiction or fact.

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• AND YET TWO MORE SYSTEM/32 REBUTTALS ARE ANNOUNCED. The first is another NCR accounting machine spruce-up . . . as the year-old NCR 299 gets expanded memory, cassette I/O, and communications capability. A core switch from 8 to 16K bits enables the newer 299 to remember 126 "program steps" and 100 "totals" -- as NCR refers to its 64-bit instruction and data words. The new tape cassette augments the 299's current keyboard and optical scan I/O methods, and should provide more economical data store and faster program loading. As for communications, the 299 can now operate on-line as satellite to a host computer, such as an NCR Century, but can't communicate with another 299. The smallest version of the new 299 -- with the smaller 8K memory -- costs $9300 with a monthly rental of $310. NCR says deliveries begin immediately.

The second new product is from Basic Four and also stresses new communications capability . . . as well as expanded disk memory. Built around a Microdata mini and dubbed Model 600, it steps in at the top of the Basic Four product line. A total of four drives of 12 million character storage capacity each can be tacked on to a Model 600, adding to 13K internal user memory (core). The disk drive features a microprocessor-controller and reformatted disk. A new communications controller permits operation in synchronous as well as asynchronous modes . . . allowing direct communications between the Model 600 and other make CPUs . . . and adding a new wrinkle to the company's product line of standalone minis. One 600 can support up to eight interactive terminals. The operating system (BOSS II) and programming language (BASIC II) are similar to those on small Basic Four systems, but because of the new disk system a conversion is necessary on all files transferred up from smaller Basic Fours. Shipments begin third quarter 1975, with a standard system costing $54,400.

• NOT EXACTLY PLASMA PHYSICS, but new technology announced by the Boys at Bell Labs is the basis for an experimental flat-screen video system that transmits handwriting, reproduces pictures, and communicates with a computer. Utilizing "plasma panels" made of neon gas cells, electronic control circuitry, and a "light pen," the apparatus can display images and shadings as the result of digital signals. Among the various things the gadget can do is display a typewriter keyboard for data entry. The ultimate in virtual?

• SMARTER THAN YOUR AVERAGE FLOPPY DISK is a new product from Applied Data Communications that combines ADC's year-old IBM compatible floppy disk with an Intel 8080 microprocessor "brain." Primary market for the microcomputer driven "Intelligent Floppy Disk System" will be in the data communications direction. With 1K bytes of ROM, 4K of RAM, and basic software a system will cost $4600. For a Keyboard it's $450 more. Deliveries will start in time for the NCC in May.

• ANOTHER NEW PRODUCT TOSSED INTO THE MICRO BIN is a 16-bit single chip processor unveiled by General Instrument in New York this week. Developed and benchmarked by Honeywell Process Control Division, the chip will be manufactured by General Instrument. Called the CP 1600, the chip is organized around a single 16-bit generalized bidirectional bus that permits all types of data communications between system components and allows for full addressing of 64K worth of memory. But lest the minicomputer community get upset, no delivery dates or prices were announced. And if you're from Missouri . . . .

• FOR THOSE OF YOU STILL FUZZY ABOUT ALL THIS MICROCOMPUTER STUFF, CAP'N Texas Instruments will explain it on the early morning toob. 20 commercial stations will be offering the TI 4-day course for dawn-cracking engineers. Check listings.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MARCH 13,1975 • VOL.10,NO.13 P.J.McGOVERN,PUBLISHER

Autotransaction update - page 7

DEC, DATA GENERAL, INTERDATA AND OTHERS BEFUDDLE TYPECASTERS AS "SUPER" MINIS COME OF AGE

"Perhaps a number of you are wondering just what a minicomputer is. Well a minicomputer, like a miniskirt, is both economical in terms of size and highly efficient in terms of doing the job required."

-- Interdata President, Dan Sinnot, at a Perkin-Elmer stockholder meeting, November 21, 1974

It's minicomputers again! In fact, if things keep up and the mini mills keep grinding out new products, 1975 may just turn out to be The Year of the Mini -- as the proliferating boxes surface everywhere. Propelled by a predicted world-wide growth rate of 25%, over 50,000 units will go out this year, recession and all. By value that will account for about 15% of all computer shipments . . . and map quite a healthy revenue curve.

Flip that "revenue" curve and you find another -- a straight-line logarithmic one -- that slopes in the opposite direction. It's the "cost" curve -- the one that represents the steadily falling prices and increasing performance that characterize developments in the minicomputer industry . . . and its downward slope portends ever new and exciting uses for that army of minis.

And while popular debate centers around the fracas at the microprocessor end of things, where semiconductor technology and bigger and better "chips" have their most visible impact, the real show may be in the other direction.

Indeed, as the "super" minis recently announced by DEC, Data General, Interdata and others find their way into computing's upper echelons . . . and as users get serious about distributed processing, data base management, and autotransaction with minis . . . some traditional concepts of computer usage may be in for revision. What that means for others in the field -- like the mainframers -- has yet to be determined . . . but it should be interesting.

One thing is certain. Though no one agrees exactly on what the computer industry will look like in five years, at least everyone agrees that it will be different. And minis may be the key.

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Superminis: the upper realm

These new systems seem to stretch the very definition of minicomputers, an elusive enough animal as it is. What each has in common is performance at the upper end of traditional minicomputer possibilities, a 6-figure pricetag, and -- perhaps most important -- a minicomputer nameplate.

Specifically, the new "Cadillac" systems are:

- *DEC's new PDP 11/70, announced last month.* As the logical outgrowth of the PDP 11/45's success, the 11/70 extends DEC's product line upward with a performance two to three times that of the 11/45, according to DEC. It's a quasi 32-bit machine (internal data paths and certain peripheral communications utilize the expanded word length) and coming from the minicomputer industry leader, it's almost as exciting in what it could lead to (more, bigger, cheaper, full 32-bit operation) . . . as in what it can do now. But not that its performance is anything to sneeze at. It was an industry competitor at his own press conference that made the following statement about the DEC machine: "It runs like a sonofabitch."

- *Data General's new C 300 Eclipse, announced last week.* This system is the result of cross-breeding some new Eclipse hardware with a specially tailored superset of S 200 Eclipse microcode and a new software package called INFOS. Its aim is to fulfil data base processing needs at the operating department level . . . and it includes some specialized file management features (through field addressing) that make it attractive for on-line dedicated use. What may be of most significance -- even more than the boost to distributed computing that the C 300 offers -- is the fact that its design was influenced by software considerations . . . and this from a mini maker! As the system designer, who worked over two years readying the C 300, said, "normally minicomputer makers -- and IBM for that matter -- have always tried to solve software problems with hardware solutions." Not so in this case, according to DG.

- *Interdata's new 8/32 "Megamini," announced this week.* Plugged as the first high-performance full 32-bit minicomputer, the 8/32 offers OEM systems builders and sophisticated end users up to one megabyte of fully addressable main store. According to the company -- which lugged an operable 8/32 (with one megabyte on!) to the 37th floor of New York's St. Moritz -- the 8/32 is a minicomputer that isn't. The company presented performance figures that compared the 8/32 with DEC's 11/70 and Data General's S 200 . . . and concluded that the 8/32 is most comparable to an IBM 370/158! Interdata pushed the advantages of a 32-bit machine and what can be done with all that addressable memory that results, e.g. faster double precision floating point processing, larger and faster programs, etc. The company also mentioned features yet to come . . . such as a multiterminal system and a telecommunications access method that will function in SDLC format.

- *Others: Hewlett Packard 3000 CX; Computer Automation "Megabyter."* The HP model (EDP/IR,Nov.6,1974) is actually a series of CPUs of varying sizes that can all operate off the same operating system. The HP 3000 subsystems are specifically designed to be functional in networking use.

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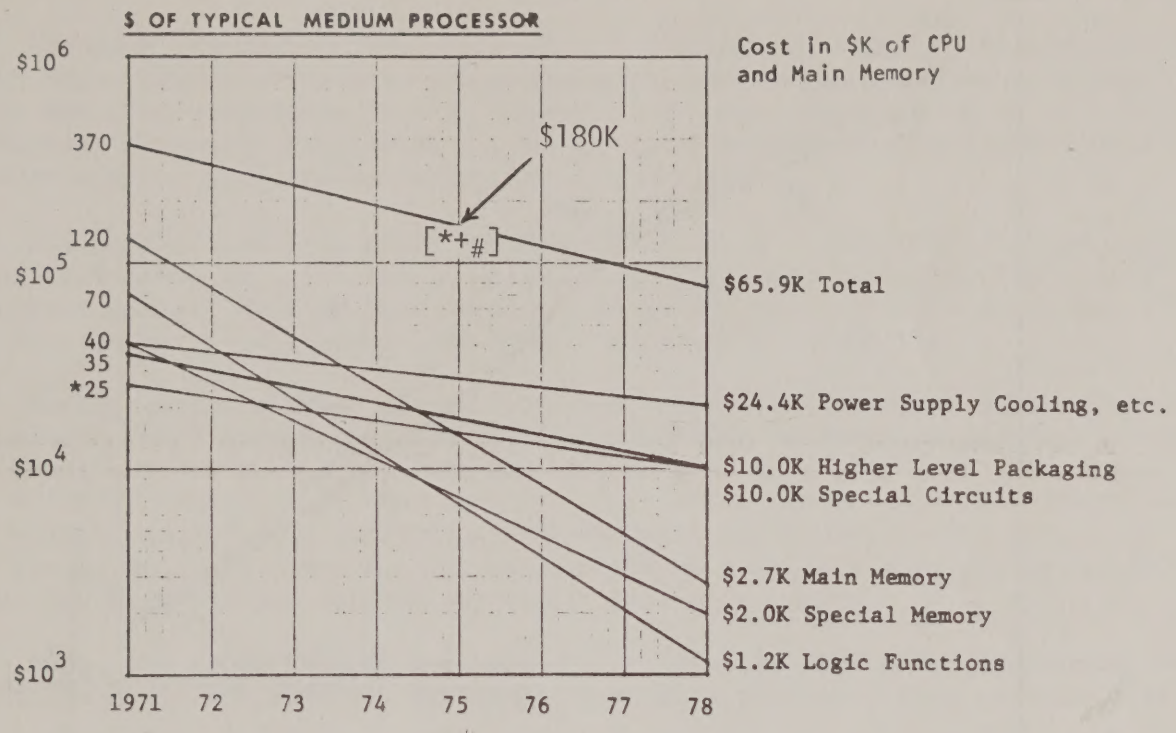
CPU EVOLUTION

From an IBM paper presented at
Spring Joint Computer Conference - 1972



* Interdata Model 8/32 ($179,000) + DEC PDP 11/70 ($164,000)
\# Computer Automation "Megabyter" ($110,000)

The Computer Automation Megabyter (EDP/IR,Jan.30,1975) -- a supermini only in its full-blown configuration -- comes equipped with an extensive microcode instruction set for byte and data string manipulation. It's a giant "naked" mini.

Depending on how you want to define it -- and how the systems are configured -- some other companies offer minis that almost qualify for "super" status. Examples are: The ModComp IV, the DEC 11/45, the SEL 85, the Varian 74, and GA's DM 200.

The learning curve

During World War II an empirical relationship was discovered between production and costs in making aircraft mainframes. The more that were made, the less expensive it became to make each one. This relationship, when plotted, was dubbed the "learning curve" and measured cumulative unit production against the unit cost . . . showing graphically the effect of "start-up" costs and/or the effect of breaking-in new technology. When plotted logarithmically (both axes) the curve becomes a straight line. It's trial, not time, dependent.

When applied to cumulative revenue -- from a product line, a company, or an industry -- learning curves become "business curves" or "experience curves" and depict business history and momentum . . . how revenue begets revenue.

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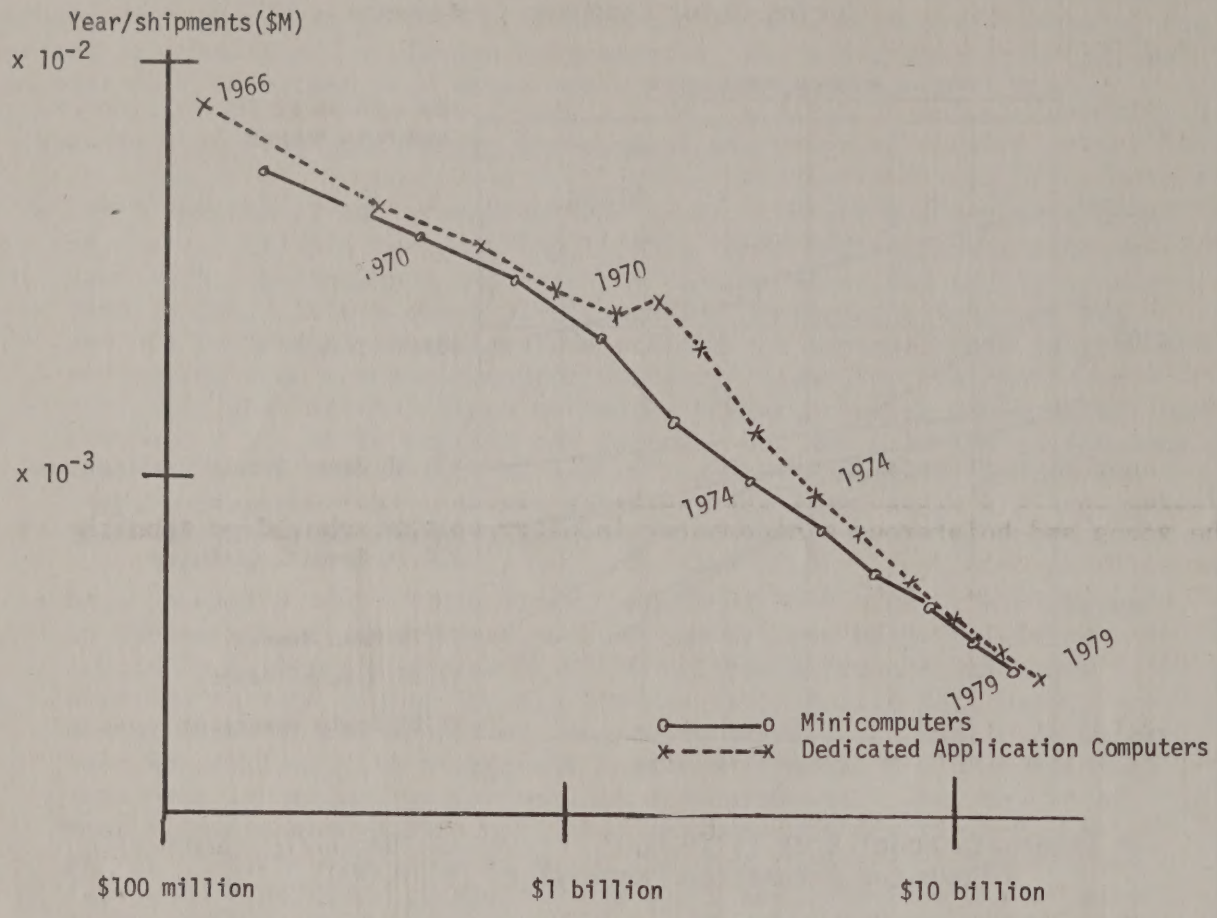
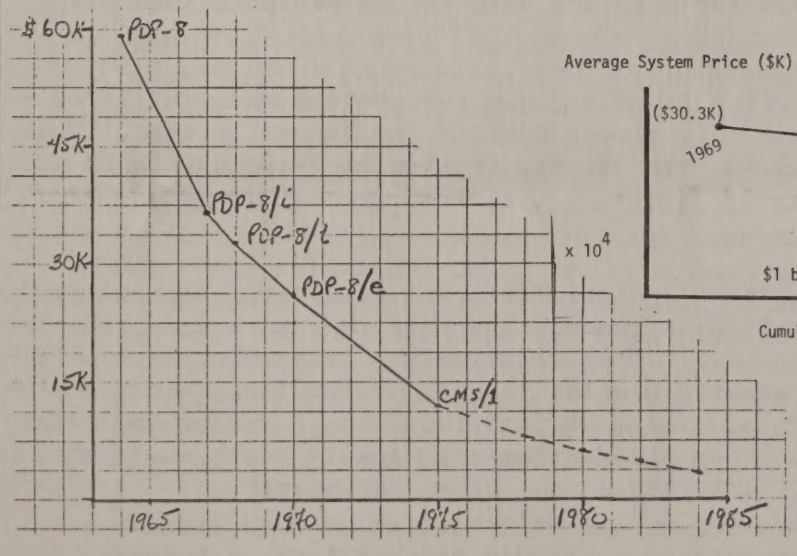
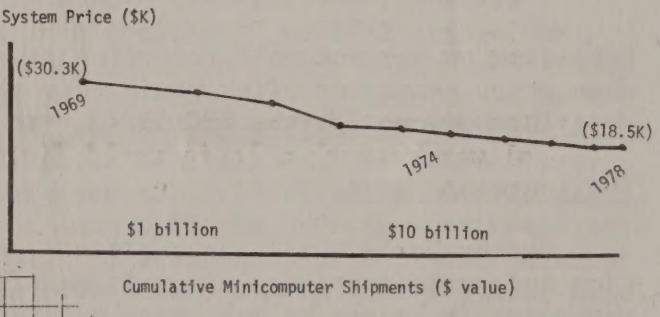
MINICOMPUTER INDUSTRY "LEARNING" CURVES





DIGITAL EQUIPMENT PDP 8 PRICES



MINICOMPUTER AVERAGE SYSTEM PRICE HISTORY

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Back in 1972 at the Spring Joint Computer Conference, IBM presented a paper that represented the effect of that "learning curve" on mainframe computer production. The company's study focused on a medium-scale processor (i.e. a 370/135 or 370/145) with one megabyte of main memory. Estimated costs were then charted over a period of time.

Although component costs are only a percentage of computer selling price, still their decrease has been the prime mover behind the trend of increased price performance so noticeable in the industry. And minicomputers -- which are quite technology-dependent and closer to raw components than the big mainframes -- can be even more affected by hardware cost factors.

So, to IBM's plot we added the positions at which the available one megabyte super minis come in . . . and their selling prices are less than IBM's predicted component costs! Machine performance between the minis and the processor IBM had in mind may be different, but that's still quite a gap.

Another manifestation of the "learning curve" can be seen in (DEC-supplied) figures on PDP 8 prices over the years. If trends continue -- and since this is the young and boisterous minicomputer industry so they should -- then the price for a PDP 8 could drop in half again in just a few years. Or, more specifically, DEC will be adding more performance or software to it and keeping the price level. For the industry as a whole, the average system value for mini shipments (worldwide) has been plotted against accumulated shipment value.

Also, the total revenue curves for (1) Group B, dedicated application computers, and (2) minicomputer shipments have been plotted. From them we see:

+ There was a discontinuous point -- read to be a major change in the industry environment -- in 1969-70. Here a combination of recession, input of new technology, and acceptance of minis as more than a "flash in the pan" probably caused the shift. The steeper slope indicates more rapid growth.

+ Minicomputer shipments (the solid line) began to take a proportionately greater share of the market for dedicated application computers. They also seemed to suffer the 69-70 discontinuity less, although the data is minimal. Note the asymptotically converging "learning curves" and year-points.

+ The average system values of mini shipments seems to be declining at a slower rate than logic would dictate . . . shoring up observations that manufacturers are pumping in more value added rather than lowering the prices of their products.

Slugfest

Another tenet revealed by "learning curves" is that costs drop independently of time. Also, the effect of "learning" in a familiar process decreases after a while . . . with the implicit message that capturing market share early in the growth phase of a product cycle is required for success. He who makes more widgets can sell them for less . . . which means that more will be sold:

• As a whole, the minicomputer industry is growing more rapidly than the general purpose mainframe computer industry -- especially in the auto-

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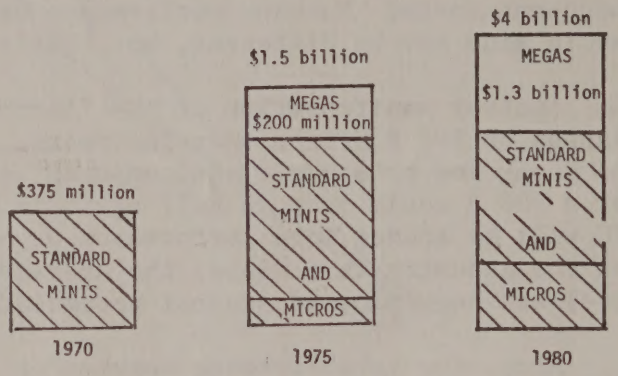
transaction sector. As long as the total computer market is segmented and minis can't replace mainframes the different growth rates don't matter. But where they do compete -- whether it's machine to machine or processing technique to technique -- then it does matter.

- Since the time to capture market share -- and there seem to be some new markets emerging out there -- is early, the "super" minis seem to have double duty. Not only do they have to forge new markets by wooing users with new concepts, but they must guard their flanks while they do it. And all the time IBM (and FS) is in the wings.

No one is too sure exactly how big the new markets will be, but they should be substantial. Informational appliances alone (POS,EFTS,etc.) will grow from scratch into a billion dollar market within five years (see opposite page). Data General foresaw a total market of about $12 billion for the type of applications its C 300 will serve. Interdata presented figures for the "megamini" market that showed them having the fastest growth of three kinds of mini: micros (<$5000), standard ($5-20,000), and mega ($20-200,000). International Data Corporation, publisher of EDP/IR, forecasts total dedicated application (Group B) computer shipments of more than $4 billion in 1980.



INTERDATA MARKET FORECAST (not to scale)

Whatever it turns out to be, the scramble for it should raise quite a dust cloud. Ads are getting more feral, and claims and counterclaims more specific. (Ironically, all this heat may tend to support IBM's contention in the courts that the computer industry is really competitive, ergo not monopolized.)

The benzene ring scenario

Minis are tailor-made for network use. In point-of-sale, airline reservations, hospital administration, data communications, and large computer control systems they bring computer power to the people. The question is how much of the medium and large scale system functions can they snatch?

Certainly where there have to be large central data bases -- and all the hairy software and security headaches that go with them -- the big computers will have a home. And with IBM-sanctioned mass storage coming along these data bases can get big indeed. But much of that control and some of that processing can be done in the field . . . where it's almost raining minis already.

What about the mainframers? CDC is already wending its way out of the mainstream into services, NCR has already grabbed a huge piece of the autotransaction pie, and IBM -- the juggernaut -- has put its imprimatur on distributed computing with SDLC. Honeywell, floudering in Europe, seems to be putting more store in its own minis (as well as high-end 6000s) . . . and Burroughs, naturally, is Burroughs. To round it all out, at press time Univac was getting ready to announce some new big computers. All in all, finding out who lands where on the "learning" curve should be interesting.

-- John Gantz, Associate Editor

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THE EFTS - POS CONNECTION
CASTING THE AUTOTRANSACTION NET

Any freewheeling lookahead at the computer industry must soon scan the area where computers meet people -- The Autotransaction Industry. At the moment, the market for "information appliances" -- POS equipment, EFTS equipment, and the like -- is growing at a phenomenal rate. POS revenues, for instance, should grow from a 1974 amount near $340 million to 3 and 1/2 times that in 1979. EFTS revenues, which should tip the scales at over $150 million this year, should grow even faster -- to $1 billion in five years.

And here minis abound. In the processing networks that support autotransaction applications they act as terminal concentrators, communications controllers, and regional processors. If the "super" minis pan out, they could invade the CPU room itself.

But these are new and highly visible markets, and certain developments -- technical and nontechnical -- could have major effects:

EFTS

Legislation jointly proposed by Sen. Proxmire and Rep. St.Germaine calling for a two year moratorium on EFTS experimentation could throttle full network development. The bill, in response to a ruling by the Comptroller of Currency that bank autotellers and POS links are not "branch" banks and therefore not subject to the National Bank Act, asks for a halt to all EFTS experiments not approved before December, 1974. By 1977, when the moratorium would expire, the National EFTS commission should have completed its study on standards and EFTS impact upon the banking world.

The cooling legislation -- concerned more about the threat large automated national banks pose to the small locals than about computer industry market expansion -- is currently awaiting action in both the House and the Senate.

POS

Here, removal of legislative and consumer controversy over use of the Universal Product Code (UPC) and calming of labor union worries could spur even more shipment growth. One retailer, Giant Food Stores, reports that even with item pricing a $140K/month operation saves $8200/month with POS.

The question of standards also raises its brambly head -- especially if POS and EFTS networks are to link up. Meanwhile, for Ma and Pa operations, electronic cash register announcements are beginning to pick up -- and the prospect of remote on-line services seems more and more likely. NCR, for one, thinks so and has just established its "Retail Management Service."

SDLC

Starting in fourth quarter 1974, IBM equipment that utilized SDLC communications protocol began hitting the streets. If SDLC is the communications key to FS that some think it is, then a new standard -- and hot market -- may have just been established that network weavers must take into account. Also, packet-switching should become a reality this year (Telenet), and AT&T's Data Under Voice (DUV) transmission should promise cheaper line costs. It's a wild, woolly world.

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• SYSTEM/32 IS OFF AND RUNNING, for the first one has found its way to Midwest Industries Inc., a small Omaha construction firm. The appropriate Industry Application Programs (IAP) went with it. The company liked the System/32's "plug-it-in-and-use" features and low cost (clerk's wage). Well, here we go.

• MAKING A FORMAL BID TO ENTER THE INTERNATIONAL DIGITAL DATA SCENE, Western Union International (not related to Western Union Telegraph) has petitioned the FCC to offer digital transmission services to Austria, France, Italy, and Spain. The International Digital Data Service (IDDS) would feature simultaneous transmission via satellite and undersea cable at speeds from 50 to 9600 bits per second. Also, dual equipment at the international carriers' operating centers and the use of transmission code words and high speed data path sampling will help alleviate transmission error.

Western Union International claims to have finessed the engineering problems of combining the two transmission methods (cable and satellite) of different propagation delay, and, in fact, offers a money-back guarantee to customers receiving a block of data with an error caused by the IDDS. WUI's proposed tariff has two components -- a fixed service charge related to the speed at which data will be transmitted and a monthly usage charge based on actual number of bits sent. The company says that 20 hours per month of full duplex transmission from Paris to New York at 2400 bps would cost $8446.

IDDS signals will be regenerated and retimed by the international carriers, which eliminates the interface problems between national and international sections (as long as data speed remains the same). WUI's application to the FCC asks for authorization to activate additional satellite and cable circuits to Austria, France, Italy, and Spain and to furnish IDDS to those points for a year's trial.

• CLAIMING TO HAVE THE ONLY FULLY INTERACTIVE MICROGRAPHIC TERMINAL/COMPUTER, Image Systems, Inc. has announced its Quest-Icon. It uses microfiche as a storage medium and consists of the micrographic terminal and a minicomputer. The computer portion can either be user-supplied or Image Systems-supplied with up to 320 megabytes of disk storage. The Quest-Icon has an on-line, random access optical storage capacity of more than 1 billion alpha/numeric characters -- about the equivalent of 213K normal pages. The company promises 90-day delivery; a typical 40 megabyte system sells for less than $100,000.

• INTERDATA SCORED A BIG ONE DOWN UNDER, with an $8 million order from the Australian Department of Defence for over 70 of the company's Model 7/32 minicomputers. The New Jersey company claims it's the largest single minicomputer procurement ever to take place in the land of wallabies and kangaroos. The 7/32s will be used primarily in data communications and centralized inventory control of military stores. Deliveries will take place throughout 1975 and 1976.

• NEW PERIPHERALS FROM SPERRY UNIVAC include a new data communications terminal (the DCT 524), two new magnetic tape subsystems for the 90/30 computer system (Uniservo 10 and Uniservo 14), and a new 8-track 90/30 Internal Multiplexor. The DCT 524 -- which is really a beefed up DCT 500 coupled with a Sperry Univac 610 Tape Cassette System -- costs $5K (rent or lease also available) and should be available for delivery next quarter. The Uniservo 10 tape system -- which has a speed of 25 IPS and transfer rate of 40 KB/sec on 9-track tape -- costs about $35K. The Uniservo 14 (60IPS,96KB/sec) costs about $50K. Deliveries are slated for the fall of this year. The multiplexor costs $12.5K and should be ready by June.

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MAR 31 1975

EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" March 26,1975 • VOL.10,NO.14 P.J.McGOVERN,PUBLISHER

Univac repackages its 1100s -- page 6

USER SPENDING PLANS INDICATE MODERATE GROWTH FOR 1975; DEMAND PROPPED UP BY LONG-TERM COMMITMENT, APPLICATIONS MOMENTUM, CPU USE

Economic predictions about 1975 may be as diverse as the doomcasters' buzzwords, and crystal balls going for a song, but at least one prediction seems to have substance: If computer users have their way, most sectors of the data processing industry will weather the current economic turmoil with little ruffling. The 1975 EDP budgets are in.

Indeed, those budgets -- for equipment, services, and salaries -- are up 14% over 1974. Although real growth is actually about 2% less than that -- and 1974 showed a slightly better rate compared with 1973 -- still it's hefty. And at a time when the nation's Sunday papers print nostalgia pieces on the Great Depression between ads for the Bicentennial, it looks even better.

This bullish outlook for the DP industry springs from a survey of user spending plans by International Data Corporation (IDC), publisher of EDP/IR. The sample in this case was (and still is) specially "structured" to statistically represent roughly 90% by value of all EDP equipment installed in the U.S. It consists of 63 large-scale users from the "Fortune 500" -- the "leading-edge" data processors and 35% of the installed base -- and 65 medium-scale users -- another 55% of the installed base and the "breadbasket" of the computer industry. Preliminary results of the on-going survey at IDC were reported in the EDP/IR December 31,1974, year-end issue.

The survey and cross-checks with other IDC market research shows several important factors propping up this user demand:

- User budgets spring from a long term commitment to EDP. Behind that is the conviction that EDP is essential to a modern-day company's survival. Budgets, therefore, are long-range planning outputs and not so susceptible to panic. The fact that 56% of IBM's installed base has been purchased by users and lessors is an example of this commitment.

- The momentum of applications development -- spurred by migration to data base management and teleprocessing -- is substantial. Users are now harvesting their computer investments. Virtually all large-scale

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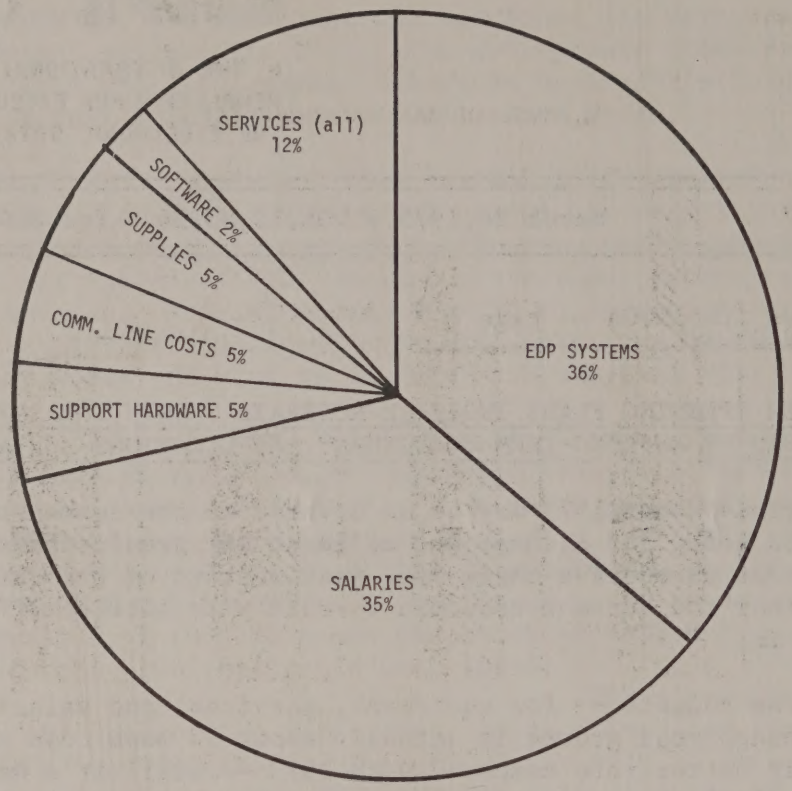
DISTRIBUTION OF U.S. USERS' EDP BUDGETS FOR 1975 ($25.4 BILLION TOTAL)



and 46% of the medium-scale users will be into DBM/TP by the end of this year. More spending on EDP, it seems, means less elsewhere.

- Similarly, computer operations are more and more on-line companywide affairs. Thus integrated into the functional structure of a company, EDP is less easily winnowed from necessary expenditures.

- Computer utilization shows little excess capacity in the EDP room. Machines at medium-scale sites work an average of two shifts a day . . . meaning increased user need can't be soaked up by on-hand equipment. Large-scale sites, for the most part, push their systems around the clock -- in deference to geography and teleprocessing.

So 1975 looks to be a year pretty well locked in then -- by both a banner 1974 and the possibility of new IBM product shipments in 1976. For sure if the mid-year turnaround is a mirage, budgets can always get cut, contracts cancelled, and applications delayed . . . but for now, at least, it appears that user spending plans have too much inertia behind them to slow for any economic frost heaves.

The recession . . .

Certainly it's having an effect. 10% of the users surveyed -- especially those in hard hit areas like the auto, semiconductor, and airline industries -- reported budget cutbacks. Another 17% reported level spending -- for a drop in real dollar growth. Often, these companies were hit with across-the-board budget cuts, and as a whole they account for a little more than a fourth of the user pool.

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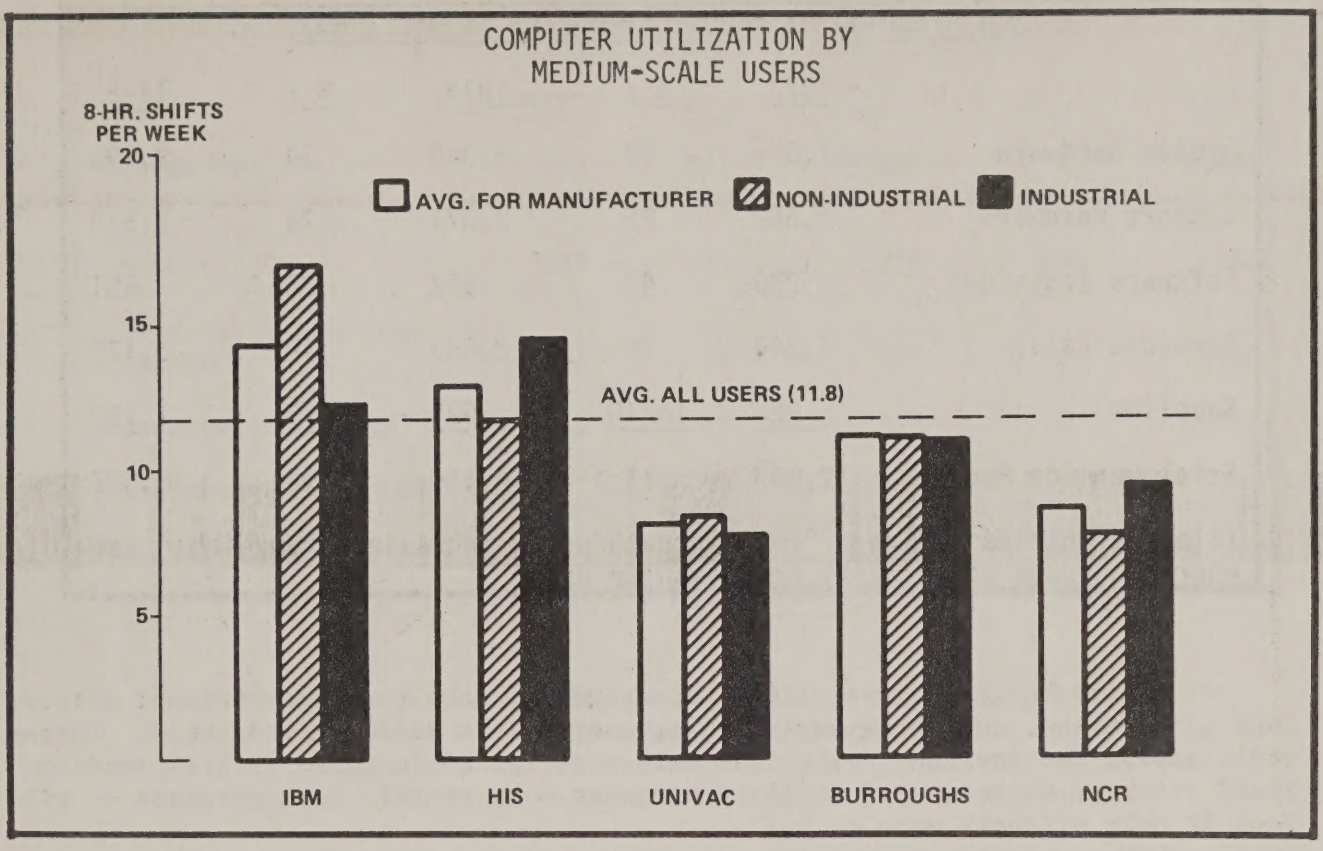

But picking up the slack are the services, financial, chemical, and petroleum industries, which account for 32% of that pool. Here real growth in EDP hardware expenditures, for instance, generally falls between 15-18%.

The rest of the users -- including those in wholesale/retail, basic metals, paper, and government -- plan to chug along at the 14% overall average. Perhaps especially important here is the government/aerospace sector -- which hasn't seen the plunge in spending like the one that paced the last computer industry downslide during 1969 and 70.

Still, it is a recession, and to ward off the chill users are finding that putting the lid on personnel spending seems to be more effective than cutting equipment costs. (In fact, part of the 1974 "boom" may have been the result of users laying in EDP "provisions" in anticipation of inflation.) When people and hardware get into the ring, it's the steel that has the edge.

Of the other method of beating EDP costs -- postponement of equipment acquisition and applications delay (often tied in with personnel cutbacks) -- IDC found surprisingly little. Only 5% of the large-scale sites had to renege on a mainframe commitment. As an IDC vice president, William Leitch, stated in an industry seminar, "overall we feel that the recession's impact on '75 will be relatively minor. We should roll into '76 with a good momentum of demand and applications relatively uninterrupted by recession problems."

. . . and inflation

The other half of the budget-vise is inflation, and in 1974 it surfaced everywhere. Hardware prices went up, salaries rose, supplies and services skyrocketed. How has it affected 1975 spending plans?

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USER SPENDING BY MAJOR CATEGORIES ($ MILLIONS)

	1973	% /	1974	% /	1975
System Hardware	7,075	12	8,045	14	9,193
Support Hardware	1,662	25	2,071	24	2,578
Software (outside)	239	47	352	28	451
Services (all)	2,240	20	2,685	18	3,170
Supplies	826	10/10	991	8/6	1,130
Total Outside Budget	12,042	17	14,144	17	16,522

(Slashed entries indicate "real" growth/price increases; "Services" category includes spending by non-computer users.)

As far as hardware goes, little it seems. Thanks to fixed-contract prices, long term leases, and third-party deals, users won't suffer immediately. Large-scale sites, for instance, will feel only a net price increase of 2.1%, medium-sized sites -- where upward mobility dictates more rental, less purchase -- will feel it only slightly more at 3.3%.

In salaries, though, inflation packs a wallop. Of the 10% increase in upcoming spending on personnel, fully 8% is for salary hikes . . . prompted by cost-of-living escalations and incentives for keeping qualified people put. Of the 2% left for increased staffing, most will be spent on experienced people (who can get those teleprocessing/data base applications up and running). For less exotic skills -- such as data entry -- spending will drop.

Dollar tracks

Total EDP spending in the U.S. for 1975 will probably nip $25.3 billion, not counting that at first-time sites. Just five years ago it was less than half that. Since then the ratio of equipment to salaries to outside spending has remained roughly the same (1:1:1), except for a slow increase in the "outside" category.

Inside those pie wedges, though, it's a different story:

- As the 370 life cycle winds down, equipment spending is drifting outward from the CPU. Disks, terminals, and communications controllers alone will account for 1/3 of the equipment shipped to IBM users in 1975, to give an example. By 1976, that percentage should be over 40.

- The fastest growth rate for equipment is that for data communication gear. Added to line costs in 1975, over $2 billion for data transmission will be spent. And that doesn't count money paid for terminals or autotransaction equipment.

- Real dollar growth of user purchases is beginning to decline . . . as users await the next generation . . . and CPU upgrading is on the wane. (Less than 15% will upgrade in 1975.)

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U.S. - COMPUTER SYSTEMS HARDWARE ($ MILLIONS)					
	1973	%	1974	%	1975
System Rentals	3,550	8/2	3,905	7/4	4,335
Indep. Per. Mnfr.: rentals	203	35	275	29	355
Third Party Leasing: payments	792	10	870	14	995
Purchases: Gp. A&B	1,973	17	2,314	16	2,679
Maintenance: Gp. A&B	557	22	681	22	829
Total EDP Systems	7,075	12	8,045	14	9,193

- Independent peripheral manufacturers -- especially those offering disks and terminals -- should reap the backhand rewards of recession. At 65% of large-scale IBM sites -- and an astounding 33% of medium-scale (single-CPU) sites -- some PCM equipment is being used.

- Third-party lessors have felt the general economic pinch, as tight money and high lending rates in 1974 and anticipated for 1975 cut into IBM 370 placement. IBM 360 leasing, however, is tailing off less rapidly than previously . . . to match the sales boom in used computers.

- Software spending is still growing fast, with data base packages the most popular. CICS, for instance, is in use at 40% of all large-scale sites. Next most popular is communications software, followed by turnkey application wares.

- As inflation puffs the cost of EDP supplies, paperless alternatives such as COM/Microfiche and cardless data entry are picking up in popularity. Double-density disk packs are also beginning to get their share of the user's dollar.

Hot tickets

There's no doubt about it. Users have voted in teleprocessing and data base management . . . and the mandate means that more and more money will be going for data communications, control and security software, terminals, and mass storage. Mainframes will have to fend for themselves in that thicket.

And also feeding that $2 billion communications Hellespont -- $1.3 billion of which will be line charges alone, mostly collected by Mother Bell -- is the autotransaction industry (see EDP/IR, March 13,1975). This all adds to money spent on minicomputers, information appliances, turnkey systems and software, intelligent terminals, controllers and so on.

But behind all this fashionable spending looms the IBM bulk. User spending alone -- if one listens to the Justice Department and myriad others -- doesn't

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determine the future direction of the computer industry. IBM also has a vote, . . . and with a gross income last year well over half of all U.S. EDP spending -- including salaries -- it's a little more equal than others.

The key may be IBM's Advanced Function for Communications (AFC), and IDC's survey found it to be a qualified success:

+ Virtual Storage, one requirement for the AFC, is a hit. Over half of the qualified IBM 370 users that can, have already switched to VS. Stll another 22% more plan to join the fold in 1975.

+ SDLC and the Virtual Telecommunications Access Method (VTAM) that go with it have yet to be proven. Users told the IDC staff that they don't fully understand SDLC and VTAM and that to them it represents one teleprocessing way to go . . . but not necessarily the way. They also thought the prices for IBM's terminals with SDLC were too high.

But add to the Advanced Function for Communications the prospect of mass storage with the IBM 3850, the spectre of IBM satellites aloft (with or without Comsat General), System/32-like remote processors with SDLC capability, and whatever else is to come, and plenty of pockets for user dollars appear . . .

. . . along with the prospect of continued industrywide growth to go along. And so it goes for 1975, a properly modest year in troubled economic times.

\+ + + +

UNIVAC MANEUVERS AT THE HIGH END;
LOWERS MEMORY PRICES FOR 1100 LINE

With perhaps more hoopla than necessary -- but certainly in the spirit of new product releases -- Sperry Univac announced successor systems to its 1106 and 1110 computers last week. Included in the package were two new disk systems and some new software, as well as additions to previous 1100 software releases.

Despite new model numbers and a certain amount of repackaging, however, the two new systems look remarkably like the old -- except for the memory. Semiconductor technology has allowed a restructuring and a shift of prices -- downward:

- The new Univac 1100/20 covers about the same price range as the 1106 II introduced three years ago. It features memory of similar speed. Maximum storage capacity, however, has been doubled to a total of 526K 36-bit words (about two megabytes) . . . at about half the price per word. Thus, users can double memory at no price increase.

- The new Univac 1100/40 uses the same modular approach to multiprocessing (see chart, page 7) as the 1110. Four models of the computer in up to eight configurations can be assembled from a combination of Command/Arithmetic Units (CAUs) and Input/Output Access Units (IOAUs). Maximum memory available is the same as on the 1110 -- 262K words primary, 1 million extended -- again at the lower cost. CAUs and IOAUs are the same as on the 1110.

Software, of course, is becoming a primary consideration in computer acquisition. And on this front, Univac has provided several new support packages that fit in with the growing trend toward data communications use and data base applications. Major ones are:

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SELECTING YOUR VERY OWN 1100/40

The CPU equivalent of the 1100/40 is the CAU (Control/Arithmetic Unit), IOAU (IOAU), primary memory (in blocks of 32K words), and extended memory (131K-word blocks). Primary memory is semiconductor with a 300 ns cycle time, extended memory has an 800 ns cycle time. The extended memory for the 1100/40 is the primary memory on the 1100/20, and costs a flat $5200 per 131K block. The cost of the primary memory starts at $7000 for the first 32K words and decreases as memory is added -- so that a maximum 524K words costs $73,134.

When all is said and done, the configurations available turn out to be possible combinations of two building blocks, plus an option:

1100/41 -- one CAU plus one IOAU.
1100/42 -- two CAUs plus one IOAU. A second IOAU is optional.
1100/43 -- a 41 plus a 42 (i.e., three CAUs, two or three IOAUs).
1100/44 -- two 42s (i.e., four CAUs, two, three or four IOAUs).

For the Univac 1110, the same CAUs, IAUs, and console are used; only the memory is different (slower and less available). Also, the 1110 doesn't allow the user quite as many choices (no 3 x 3, for example).

- Remote Processing System 1100 (RPS-1100), a general-purpose data management and file processing system for Uniscope 200 or 100 users. It can be used, the company says, by "plant managers, expeditors, foremen and others to interactively develop and use their own applications."

- QUOTA, a way for the site administrator to control system resources. Using the package, says Univac, a site administrator may "define and enforce limits for demand users, at the account number or password level, ensuring that no single user can preempt the entire system."

- Query Language Processor 1100 (QLP-1100) permits the user to interact with data base management system in either a demand or batch mode.

- Conversational Time Sharing 1100 (CTS-1100) becomes a demand monitor under the 1100 Operating System. It "provides the interactive or demand user with a man/machine interface in a language to which he is accustomed," and includes a desk calculator mode.

These machines prepare Univac for what may be an intensified round of competition in the top-of-the-line marketplace . . . the leading-edge base of sophisticated users. It's the portion of the market where HIS is having its relative success with the 6000s . . . and the portion that will be impacted if, as the rumor persists, IBM announces a large-scale 370/188 or something.

The top two size classes of computers (as IDC analyzes its estimate of the computer base), in which the new 1100s compete, account for almost one-third of the installed base of computers. For Univac, however, this represents some 57% of its installed base; indeed, Univac probably needs the equipment to protect its base. For every 1110 it has installed, there are over three 1108s out there . . . and only a handful of the more than 200 systems are still on rental from Univac. Thus, this represents potential net new business of at least $750 million.

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• JUST MISSING THE "GRAY SHEET" DEADLINE WITH ANOTHER SUPERMINI, Varian Data Machines announced the V75 -- what it calls the most powerful minicomputer on the market. Like the DEC PDP 11/70 and the Interdata 8/32, the V75 offers some 32-bit features -- primarily in the ability to handle 8-, 16-, and 32-bit operands. Its instruction set is a superset of standard V70 Series instructions, . . . making it upward compatible.

Dual memory buses on the V75 allow for the transfer of up to 3 million 32-bit words per second, and up to 512K bytes of fast (330 ns) semiconductor memory storage is available. With the V75 hardware comes a new Fortran compiler and a multiprogramming operating system called Vortex II, which supports, among other things, a moving head disk system of up to 360 million bytes. Prices on the V75 run from $50K to $150K, and deliveries are slated for July. By then, who knows who else will have joined the "Super" club?

• IN A SPIRIT OF DETENTE, AT&T and thirteen others have signed an agreement covering the provision of Bell services to the other carriers, among them: ITT, RCA Global, Datran, MCI, Southern Pacific, and the two Western Unions. The agreement, generated by intensive negotiations over the past five months, co-opts the current FCC inquiry into Bell's availablity to other carriers.

In fact, the agreement -- which calls for an 18-month moratorium an any new AT&T tariffs other than the ones reached in the agreement -- suggests that the FCC discontinue that inquiry. Should the FCC decide not to call it off -- or approve the recent pact -- by the end of next month, then the parties are free to withdraw. AT&T spokesmen saw no reason for the FCC not to go along.

• ALSO BEFORE THE FCC FROM MA BELL, is a request to allow AT&T to switch its depreciation procedure from "straight line vintage group" to "Equal Life Group." According to Bell, the ELG procedure would allow its companies to match more closely the rate of capital recovery with the actual life of each group of property. The procedure would also reduce the impact of inflation, risk of technological obsolescence, and the amount of external capital requirements over the long run. In the short run, however, depreciation expenses would go up -- as the property covered depreciates faster than before -- "and service rates would have to reflect those higher costs." Naturally.

• THE NEW PRINTING TERMINAL SYSTEMS FROM BURROUGHS are called the TC 4000 Series and feature a new wire matrix console printer which prints at 60 cps and transmits data at 75 to 9600 bits per second. The four models of TC 4000 take data entry manually or automatically from cassette or industry-compatible minidisk. They also feature a programmable "forms compose" capability which optimizes movement of the printer or forms to positions where the information is to be printed. Communication lines are thereby spared the need to transmit spacing or line-filling symbols. Purchase prices for the new systems range from $5K to $9.5K, and deliveries should begin around midsummer.

• HONEYWELL EXPECTS SHARPLY REDUCED EARNINGS FOR FIRST-QUARTER 1975, according to an announcement by E.W.Spencer, Chief Executive Officer. Decline in computer earnings, he said, is the result in a drop in outright sales and conversions. What's that about bringing out a whole new product line in the midst of recession?

• ADD $17 MILLION TO THE AMOUNT OF CALCOMP DISKS GOING TO BURROUGHS over the next three years, comes the word out of the Anaheim independent.

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Review and Forecast

EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" APRIL 30,1975 • VOL.10,NO.15&16 P.J.McGOVERN,PUBLISHER

At the watershed

SHIPMENTS BREAK RECORDS, DESPITE RECESSION, AS SIGNIFICANT CHANGES APPROACH

During 1974, the computer industry set some shipment milestones as it proved it is at least recession resilient when caught at the proper point in its product cycle. General-purpose hardware shipments edged above the $10 billion mark for U.S.-based manufacturers; minicomputer revenues to U.S. firms topped the $1 billion level for the first time and promised to keep growing.

So as 1975 rolls by and the economy improves, the computer industry enters a slight holding pattern . . . but not for too long. The industry is destined for still more significant change during the next few years. Indeed, the triggers of this change are cocked:

- The main legal event -- U.S. vs. IBM -- is scheduled to begin May 19 with IBM riding rather high on its present guiltlessness before any court. The trial's outcome eventually will determine the structure of the information processing industry.

- A new product cycle -- whether the highly glamorized FS promised by IBM in the "Telex documents" or just a new round of hardware that will gradually lead to new applications -- is likely soon to be unveiled. Some of the equipment for the late 1970s, in fact, is already here.

- Generations of various type products -- data entry and mass storage peripherals as well as CPUs and main memory -- are stimulating user acquisition patterns that eventually will smooth out shipment curves.

- Sparked by IBM's System/32, the market for small business computers -- and/or smart office machines -- will bring data processing (and some DP equipment in most cases) but no DP managers to a whole new strata of user organization.

- Market and product definitions are about to change as services compete head-on with products . . . as networks, microprocessors, and mass memories provide the basis for true distributed computing.

- In the face of such change, the nature of most mainframe companies will change significantly as they find and establish safe identities.

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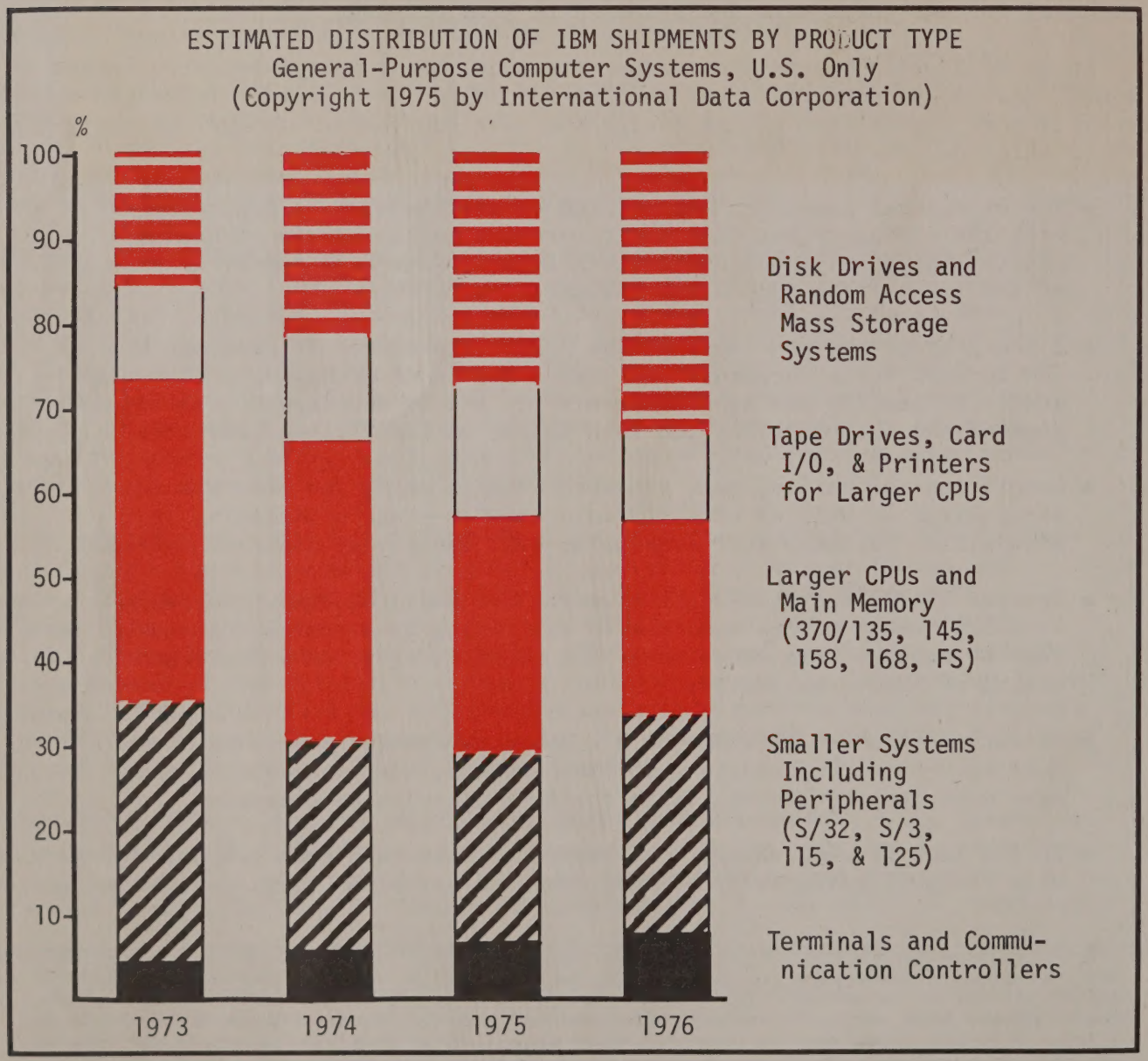
The how and the why of this change -- in many cases -- looks as much like a strategy for survival in the face of a split-up IBM as it does like anticipatory response to the technology of the 1980s. In any event, it is important to take a quick look at each of the major mainframers; and in most cases developments are best related to similar situations with IBM.

The product cycle(s)

The bar chart below -- EDP Industry Report's estimate of how IBM's hardware shipments within the U.S. vary by year during the current time period -- illustrates several aspects of the product cycle(s) going on.

- The use of telecommunications continues to grow. The numbers behind these charts don't even include information appliances (page 15).
- Small systems continue to be important as they spread the customer base further down the pyramid.



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STATUS OF WORLDWIDE COMPUTER MARKET FOR U.S.-BASED MANUFACTURERS
(Copyright 1975 by International Data Corporation)

	1974 Shipments: $M	% Total	In Use Yearend 1974: $B	% Total	1973-74 Change
IBM	6,960	62.0%	32.0	59.1%	+ 10.2%
Plug-Compat.	735	6.5	2.2	4.1	+ 34.8%
IBM Systems	7,695	68.5	34.2	63.2	+ 11.5%
HIS	685	6.1%	5.3	9.8%	+ 5.2%
Univac	590	5.3	3.9	7.2	+ 8.1%
Burroughs	565	5.0	2.8	5.2	+ 23.1%
DEC	430	3.8%	1.3	2.4%	+ 36.4%
NCR	320	2.9	1.4	2.6	+ 18.8%
CDC	230	2.0	2.2	4.1	+ 9.3%
Others (incl. minicomputers)	720	6.4	3.0	5.5	+ 35.3%
TOTAL	$11,235M	100.0%	$ 54.1B	100.0%	+ 12.9%

- Mass storage is booming -- from the changeover within removable disk technology as well as the expected move to mass storage systems.

- Large computer shipments will definitely need a stimulus by 1977.

Because of factors such as these, EDP/IR has assumed that shipments of new IBM central processors -- whatever they are called -- will begin late in 1976 and be a significant factor in shipments beginning in 1977. The General Purpose forecast (page 10) assumes this. Is it FS? That's a more difficult question. IBM said on March 13:

> FS was a label that meant "Future Systems." The label is no longer in use, but that in no way implies that our development efforts on products for the future have stopped.

This is the statement from which stems "announcements of the cancellation of FS!" As far as EDP/IR is concerned, a programmerless, English-language computing system -- as many seem to think FS was supposed to be -- won't be implemented in 1977. A new round of CPU/memory hardware will be here. And much of the next hardware round could well be used to implement a future type approach to computing.

Meanwhile, the other mainframers are proceeding along paths similar to at least some aspect of what IBM seems up to. We'll take a quick look:

Other than IBM, there are really only three full-fledged general-purpose computer systems manufacturers left in the race -- Burroughs, HIS, and Univac. (And there are even rumors that one of these could be retreating.) The others do their own thing: Control Data continues on its announced plan to be a services company; NCR emerges as the leading autotransaction company; DEC continues -- successfully -- to market mass-produced hardware and timesharing computers.

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Burroughs -- as it goes its own way -- continues to make the best gains of any mainframer. Shipments last year increased 24% to its core of loyal users and others who have opted for the Burroughs approach to multi-processing. In addition, the company has a viable approach -- via the L Series electronic machine or the B 700/1700 route -- for accounting machine users who want or need to upgrade to true EDP. What's more, the company's TC terminal computers are popular outside its base of mainframe users.

One of the major challenges Burroughs will face during the next few years is to protect its huge accounting machine base from the onslaught of IBM's System/32. At present, there is no user data to interpolate; IDC is starting to collect it. Meanwhile, there are arguments as to the effect System/32 will have on the Burroughs base. It probably won't be too severe. Both Burroughs and IBM attempt to present the small user with a total solution -- not hardware. So satisfied Burroughs users are not likely to try another vendor.

Honeywell Information Systems, among other things, got caught last year in the double vise that a new product cycle combined with recession can bring. With a concept designed to take care of all its existing customers, HIS about this time last year introduced a full range of computers -- based on GE products at top and bottom of the line -- and the successful GECOS operating system. The on-order situation seems pretty good.

Developments so far in 1975, however, seem to indicate a change of emphasis as to computers within Honeywell. The management selection/change of headquarters location of late last year stripped autonomy from the operation; rumors flourished about Honeywell's selling out to the French, getting out of the peripherals business, even selling off its installed base in the U.S.

So far, HIS has announced its 30/70 peripheral venture with CDC . . . seems sure to lose its grip on Honeywell Bull . . . but apparently is betting on livening up its computer business by "liberating" IBM System/3 users (page 20). All in all, there are questions . . . as well as grounds for hope -- new products and new users as recovery from recession begins. But a gradual decommitment -- combined with an increased emphasis on controls and communications, with emphasis on minicomputers -- would not be a surprising development.

Sperry Univac for several years seems to have spawned rumors that it is going to announce -- soon -- a small business computer. But so far, the company has opted to go after the medium- and large-scale computer customer -- its own as well as those picked up from RCA -- with a successful offering of equipment. The recent merger of Remington Rand into the Univac division could change this, however, bringing even more pressure to enter the market IBM's System/32 has opened for many people.

At present, Univac seems to be on a successful medium-scale tack based on the 90/30 announced last summer. Deliveries only started a couple of months ago, but feedback is that this product -- almost a computer family with its rental (and corresponding capability) ranging broadly from $4,000 to $17,000 a month -- is being successfully received.

And -- being very careful to protect the mainstay, large and very large 1100 end of its product line, keeping it up to snuff during the time period in which IBM is expected by most observers to announce and even begin deliveries of new large-scale offerings -- Univac recently perked up its product line by adding semiconductor memory (thereby reducing memory prices) and allowing more multi-processing with the new 1100/20 (a product in the 1106 II price range) and 1100/40 (priced, if fully configured, about as high as a user would want to go). Also included are significant software packages.

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Control Data and NCR have a joint development effort for a future series of processors -- and seem to be quite successful with their joint effort in peripherals, which ICL has also joined. It will likely be just a matter of time before the CDC/Honeywell peripheral effort will be merged with CPI. But insofar as general purpose computers are concerned, each of the companies seems to be following a plan under which CPUs per se are primarily support products.

Control Data says loud and clear that it is out to become a services company -- using its network and equipment as the factory. Along the way it is also producing good revenues from sales of peripherals on its own, and seems to be having reasonable success toting up orders for its new Cyber 170 series machines.

NCR, for its part, is illustrating how to become the leading autotransaction supplier. Hardware revenues from banking and retail terminal and data entry systems almost doubled last year from just over $150 million in 1973 to $296 million in 1974. Add in some revenues from supporting services, and you have the autotransaction giant. And the other major area of activity coming down the pike would seem to be the small business user market (and protection of installed base). Once again, computers continue to be necessary products to support (and capture) other business. Having a line developed jointly with CDC could only help to enhance a reliability/dependability reputation for backup equipment.

These "other" mainframers accounted for 25% of general-purpose computer shipments in 1974 and -- because many of their product cycles are still swinging up as IBM's shifts downward -- their shipments could account for nearly 30% of the total during 1975. Most shipment levels in the charts (pages 9-11) will appear slightly larger than would be expected; forecasts for 1975 and beyond are expressed in 1975 "if-sold" dollars (calculated at prices -- most of them higher -- posted for 1975).

MINICOMPUTER SHIPMENTS SLOW TO A GALLOP AS INDUSTRY MELLOWS; NEW PRODUCTS STRETCH DEFINITIONS; 1975 REVENUES TO NUDGE $1.5 BILLION

Once it was easy. EDP/IR called them dedicated application computers -- they were mainly minis -- and market forecasts were relatively straightforward because they were in a class by themselves. But now they can come in forms varying from single-board components to software-shrouded general-purpose systems . . . they don't always have to be purchased outright anymore, rentals and leases are available . . . and manufacturers have even benchmarked performance of some against IBM 370/158s.

Sometimes it seems that the only way to tell if a computer is a mini or not is to see who makes it.

What it boils down to is a question of definitions -- price, dataword size, use -- and some new ones are probably needed. But until they are worked out, EDP/IR and publisher International Data Corporation will look at this volatile business as we have in the past: The production and marketing of the computers normally listed in the semiannual Group B Census (and some new products announced by the minimakers). Shipment and installed base history and forecasts are presented on page 11; a market share breakdown -- by number and value of shipments for U.S. manufacturers -- appears on the next page. It should be noted that, for all companies except IBM, revenues are used as dollar shipment values.

But the numbers aren't everything -- not by a long shot. EDP/IR observes several trends -- some working seemingly at cross purposes -- behind the digits; most will have an effect on the industry's future:

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- *Use in networks:* More and more minicomputers are finding niches in commercial data processing environments -- yet away from the computer room. Hewlett Packard's HP 3000, General Automation's DM 200, and Data General's C 300 Eclipse are examples of minis particularly well-suited for such distributed use.

- *Compatible families, modular system building:* Consistent with the increased amount of software value being added to minis these days, the manufacturers are stressing product line compatibility and modularity . . . which may hinder the ability for a maker to swing with the technological currents but pays off in customer base grooming.

- *Shifting applications:* By far, the most common use of minis has been in the factory or the lab for process control, automation, instrumentation, and engineering . . . but as microcomputers invade the low end of these domains, more and more minis should find themselves landing in autotransaction, commercial DP, and communications systems.

- *Low-end encroachment:* Microprocessors and computers are here to stay, and the smaller minis (e.g. Computer Automation's Naked Mini) may find themselves undercut by the Intel, Rockwell, National Semiconductor, and other chips. The big minis, however -- in addition to all types of terminal equipment and other peripherals -- will emerge as an end market for these same micros. EDP/IR estimates that only 15% of the mini market will be exposed to the micro threat during the next several years.

- *High-end expansion:* Continuing cost declines and technological improvements have made big-scale minis viable, and IBM has at last provided a yardstick -- in the commercial DP market at least. DEC, Data General, and Hewlett Packard -- all of whom have substantial end user

DEDICATED APPLICATION COMPUTER MARKETPLACE -- 1974 ACTIVITY
(Estimates of Units Shipped and $ Million Revenues; Copyright 1975 by IDC)

Company	Units	% Total	$M Revenues	% Total
Digital Equipment	14,000	29%	$ 410	35%
Hewlett Packard	4,000	8	150	13
IBM (*value of shipments)	2,500	5	145*	12
Data General	5,900	12	92	8
General Automation	2,600	5	65	6
Honeywell	725	2%	$ 50	4
Varian	1,200	3	34	3
Interdata	975	2	30	3
ModComp	900	2	26	2
Computer Automation	4,200	9	22	2
Systems Engineering Labs	180	-	$ 18	2
Microdata	2,300	5	15	1
Digital Computer Controls	2,500	5	10	1
Others	6,020	13	103	8
TOTALS	48,000	100%	$1,170	100%

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business -- may resent the new System/32-think, but at least they have the advantage of a new price and performance benchmark.

- *OEM to end-user balance:* Approximately 65% of the units going out are to original equipment manufacturers, but only 45% of the dollar value. Mini makers are constantly searching for the proper mix, balancing volume sales at OEM discounts (and subject to big cancellations) against development and support "handholding" costs. During economic slowdowns, it appears, OEM business remains the more firm.

Having crossed the great $1 billion divide in 1974, the minicomputer industry seems finally to be coming of age. In 1976, business will rebound to above 30% revenue growth following a "depressed" (25% growth) year in 1975. Then, growth will slow to a healthy (20%-to-25%) but unhectic pace for the final years of the 1970s. Manufacturers will be forced to rely more and more on sophisticated marketing and smart product development to sell their wares. Sheer energy and innovation are no longer enough . . . users are wising up.

Another telltale sign of this ripening is the burgeoning quantity of software that the mini houses are issuing these days: potent operating systems, high-level programming languages, compilers, optimizers, and even data base management systems. As hardware costs drop, "value added" gets more cerebral.

Chips more promise than threat

MICROPROCESSORS GO MAINLY FOR NEW APPLICATIONS OR FOR MINICOMPUTER SUPPORT

As the flashy micros grab trade journal headlines and chips grow in complexity (the phrase "Grand Scale Integration" [GSI] has already been coined) one question keeps popping up. How will the minicomputer industry -- or all of computerland for that matter -- be affected by the onslaught? The chips are certain to cause a revolution in the electronics industry, but does that mean disruption to the computer industry . . . or will there be a bloodless coup?

Studies by International Data Corporation -- which began detailed investigation of the semiconductor industry last year -- indicate there will be an eighty-fold increase in microprocessor unit shipments from 1974 (when shipments hit the 100,000 level) to 1980. In dollar terms, this will mean a growth from the $110 million level (for CPUs and memory) this year to about $700 million by 1980. And by that time, microprocessor chips and systems will add up to about one-fourth of all integrated circuit shipments from U.S. factories.

But even as all these microprocessors gush forth and cause attendant upheavals in the semiconductor industry, certain factors will ameliorate the actual impact their presence has on the computer industry:

+ Unit costs for microcomputer sets will decline by a factor of six in less than four years. This means the price will go from current levels of about $600 per set (including memory and I/O) to the $80-to-$120 range in 1977. This dramatic drop in cost implies (and actually will result from) that micro makers will need to find and plumb new mass markets. Even if all the minicomputers forecast to be shipped in 1978 were replaced by micros, it wouldn't be nearly enough business to support an industry. So thrust into the computer area won't even be at the top of the micro makers' lists.

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+ Microprocessor makers are not considered capable of supplying systems with the equivalent in software, support, and price/performance that building-block minis offer today. By 1976 and later, however, some OEMs may choose to replace outside minis for in-house or custom-built micro systems, but penetration is estimated at 15% of the market (by number) at most. Other microprocessor drawbacks are: lack of speed, versatile instruction sets, I/O capacity, and fast data transfer; cost of the subsystem external to the microprocessor unit.

+ Sole source availability and shakey lead-times for microprocessor CPU components are design inhibitors at the component level. Normal "make or buy" decisions about component procurement will be heavily influenced by minicomputer prices during 1976 and 1977.

Thus, for reasons such as those indicated above, microprocessors have a better chance of ending up as components in minicomputers than as replacements. In this role, penetration is expected to be about 15% to 20% in 1977, increasing to 45% or even 50% by 1980. Even then -- with shipments of minicomputers well over the 100,000 mark in the United States alone -- this will be a small market for microprocessors. In other words, the chipmakers will have to explore new applications if they want to bring home the bacon . . . and the minicomputer industry -- plus the peripherals and terminal portion of the general-purpose industry -- is much more likely to be enhanced than threatened by microprocessors.

ACTION IN THE LEGAL THICKET -- AT A SNAIL'S PACE?

Much of the industry news this year radiated out from courtrooms and legal chambers as IBM contended with its tangle of antitrust lawsuits . . . and as 1975 begins to shape up, it looks as though the record-setting number of cases against that company may well be a good example of the hares chasing the hound.

It's quite possible that legal developments ahead could have a much more profound and lasting effect on the shape of the industry -- meaning for the most part IBM -- than any other single factor . . . and with the Justice Department case about to start and the prospect of the U.S. Supreme Court looking (or deciding not to look) at the issues in the Telex case, 1975 may be the year to watch. A Review and Forecast recap:

Telex vs. IBM

This was the big one. On late Friday, January 28, 1975, almost a year after IBM filed its appeal in the case, the three Judges -- Seth, McWilliams, and Doyle -- sitting for the U.S. Court of Appeals, Tenth Circuit, reversed their Tulsa compatriot, Judge A. Sherman Christensen, and found IBM not guilty of monopolistic practices. Adding to the plaintiff's chagrin, Telex was found still answerable to theft of trade secrets -- to the tune of $17.5 million compensatory damages and $1 million punative damages. That works out to more than a sixth of the company's annual revenue.

It was a potent, percussive decision, and trading in Telex and IBM stock was immediately halted on the New York exchange. When it resumed, IBM's shot up and spurred a rally on Wall Street . . . and Telex' skidded downward, causing shudders throughout the PCM world. One company at least, Transamerica, quickly wrote $13 million off the value of Telex gear in its leasing portfolio in an attempt to cut future losses due to the equipment's dwindling viability.

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WORLDWIDE COMPUTER MARKET (U.S.-BASED MANUFACTURERS)

	Number Systems Shipped	Cumulative Number In Use	$ Million Value Shipped	$ Billion Value In Use
		WORLDWIDE		
1969	19,100	87,000	$ 6,805	$ 29.3
1970	23,100	105,800	6,715	34.2
1971	27,800	129,200	7,077	38.5
1972	40,900	160,300	8,535	42.5
1973	54,130	204,800	9,575	47.9
1974	62,320	255,840	$ 11,235	$ 54.1
1975	77,400	324,500	$ 11,170	$ 60.8
1976	112,800	426,300	12,240	68.3
1977	144,500	558,800	14,900	76.8
1978	169,500	713,300	17,700	87.5
1979	185,900	885,900	18,920	99.7
		UNITED STATES		
1969	12,700	56,800	$ 4,430	$ 20.3
1970	14,600	68,300	3,920	23.0
1971	17,600	83,200	4,177	25.1
1972	27,400	104,000	5,395	26.8
1973	38,700	133,250	5,945	29.9
1974	42,900	165,040	$ 7,030	$ 33.6
1975	53,300	209,800	$ 6,900	$ 37.6
1976	78,000	277,000	7,500	42.0
1977	98,800	361,300	9,100	46.9
1978	114,900	458,200	10,720	53.2
1979	128,000	566,200	11,240	60.2
		INTERNATIONAL		
1969	6,400	30,200	$ 2,375	$ 9.0
1970	8,500	37,500	2,795	11.2
1971	10,200	46,000	2,900	13.4
1972	13,500	56,300	3,140	15.7
1973	15,430	71,550	3,630	18.0
1974	19,420	90,800	$ 4,205	$ 20.5
1975	24,100	114,700	$ 4,270	$ 23.2
1976	34,800	149,300	4,740	26.3
1977	45,700	197,500	5,800	29.9
1978	54,600	255,100	6,980	34.3
1979	57,600	319,700	7,680	39.5

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GENERAL-PURPOSE COMPUTER MARKET (GROUP A)
(U.S.-BASED MANUFACTURERS)

	Number Systems Shipped	Cumulative Number In Use	$ Million Value Shipped	$ Billion Value In Use
		WORLDWIDE		
1969	11,000	66,700	$ 6,450	$ 27.8
1970	12,000	74,800	6,300	32.4
1971	14,300	85,200	6,700	36.3
1972	18,300	94,800	8,000	39.8
1973	20,230	106,800	8,800	44.5
1974	14,320	111,840	$ 10,065	$ 49.5
1975	17,400	122,500	$ 9,700	$ 54.8
1976	27,800	141,300	10,300	60.4
1977	34,500	165,800	12,500	66.6
1978	34,500	187,300	14,800	74.6
1979	30,600	206,900	15,500	83.4
		UNITED STATES		
1969	6,000	40,700	$ 4,150	$ 19.1
1970	5,700	43,800	3,600	21.5
1971	7,600	49,200	3,900	23.3
1972	10,700	54,000	5,000	24.7
1973	14,000	62,250	5,400	27.3
1974	8,900	65,040	$ 6,220	$ 30.2
1975	11,600	72,800	$ 5,900	$ 33.2
1976	18,500	87,000	6,200	36.3
1977	21,800	102,800	7,500	39.7
1978	20,900	116,200	8,800	44.1
1979	18,000	128,200	9,000	48.8
		INTERNATIONAL		
1969	5,000	26,000	$ 2,300	$ 8.7
1970	6,300	31,000	2,700	10.9
1971	6,700	36,000	2,800	13.0
1972	7,600	40,800	3,000	15.1
1973	6,230	44,550	3,400	17.2
1974	5,420	46,800	$ 3,845	$ 19.3
1975	5,800	49,700	$ 3,800	$ 21.6
1976	9,300	54,300	4,100	24.1
1977	12,700	63,000	5,000	26.9
1978	13,600	71,100	6,000	30.5
1979	12,600	78,700	6,500	34.6

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DEDICATED-APPLICATION COMPUTER MARKET (GROUP B)
(U.S.-BASED MANUFACTURERS)

	Number Systems Shipped	Cumulative Number In Use	$ Million Value Shipped	$ Billion Value In Use
		WORLDWIDE		
1969	8,100	20,300	$ 355	$ 1.4
1970	11,100	31,000	415	1.8
1971	13,500	44,000	377	2.2
1972	22,600	65,500	500	2.7
1973	33,900	98,000	770	3.4
1974	48,000	144,000	$ 1,170	$ 4.6
1975	60,000	202,000	$ 1,470	$ 6.0
1976	85,000	285,000	1,940	7.9
1977	110,000	393,000	2,400	10.2
1978	135,000	526,000	2,900	12.9
1979	155,000	679,000	3,420	16.3
		UNITED STATES		
1969	6,700	16,100	$ 280	$ 1.2
1970	8,900	24,500	320	1.5
1971	10,000	34,000	277	1.8
1972	16,700	50,000	360	2.1
1973	24,700	71,000	540	2.6
1974	34,000	100,000	$ 810	$ 3.4
1975	41,700	137,000	$ 1,000	$ 4.4
1976	59,500	190,000	1,300	5.7
1977	77,000	258,500	1,600	7.2
1978	94,000	342,000	1,920	9.1
1979	110,000	438,000	2,240	11.4
		INTERNATIONAL		
1969	1,400	4,200	$ 75	$ 0.3
1970	2,200	6,500	95	0.4
1971	3,500	10,000	100	0.5
1972	5,900	15,500	140	0.6
1973	9,200	27,000	230	0.8
1974	14,000	44,000	$ 360	$ 1.2
1975	18,300	65,000	$ 470	$ 1.6
1976	25,500	95,000	640	2.3
1977	33,000	134,500	800	3.0
1978	41,000	184,000	980	3.8
1979	45,000	241,000	1,180	4.9

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Most recently, Telex had its petition for re-hearing in front of the full appellate court rebuffed . . . and readied itself to ask for a hearing before the U.S. Supreme Court. EDP/IR's antitrust lawyer-consulant in the matter gave the High Court 50-50 odds of accepting the case . . . and almost none of actually hearing it. The reasoning behind the latter prediction is the supposition that if the court agrees to review the Telex petition, then IBM will settle out of court with the PCM . . . to avoid another reversal. This would allow the Tenth Circuit decision to survive in the history books.

Although the decision in the Telex case is binding only in the Tenth Circuit, the legal reasoning on questions of market share and predatory conduct could be applied in the other cases (indeed, some of the "West Coast" litigants have already amended their complaints to account for a broader market definition) . . . and at any rate is a significant bolster to IBM's defense.

U.S. vs. IBM

While the Telex case scooped most of the headlines, the Justice Department case rumbled slowly toward a conclusion . . . of a beginning. Over objections of both parties, the presiding judge put his foot down and called for a May 19, 1975, trial opening -- six years, four months, and two days after the case was first begun -- and indicated that his patience was wearing thin with the delays.

And most of the Judge's displeasure was directed toward the government . . . to whom time and inertia appear to be foes at least as formidable as giant IBM. Witness the following exchange which took place at a pretrial hearing on March 4 between Judge Edelstein and the Government's Counsel:

The Court: You have been getting further and further behind in the preparation of this case. Very few deadlines have been met. Now, if this was due to inadequacy of staff or other reasons, why haven't you undertaken to correct them? And if you couldn't correct them because of your bureaucratic problems, why didn't you ask me to help you?

Counsel: I think bureaucratic problems certainly are a factor, your Honor. However, I think a very large factor is the kind of proceeding that we have been involved in here; that is, a far flung discovery proceeding that has never stopped.

The Court: You keep harping on that. It is getting nauseating. Your adversary has had to cope with the same problems, has it not? They have had to meet all of these problems. IBM has provided the manpower necessary to defend. Why hasn't the Department of Justice done the same?

The DOJ case per se attempts to show that IBM is a monopoly by virtue of its marketplace oomph (de facto standards, "price umbrella," entry-capital hindrance) . . . and the company's clear use of that monopoly power (bundling, fighting machines, educational allowances, below-cost peripherals). In its old issues, at least, the DOJ case is primarily the same as the CDC case. So it could be argued that preparation slow and ragged enough to fluster the judge will still have substance at least as solid or better than CDC's. Remember that IBM chose to pay $100 million, give up a $63 million company (SBC), and work out R&D contracts in order to settle with CDC out of court.

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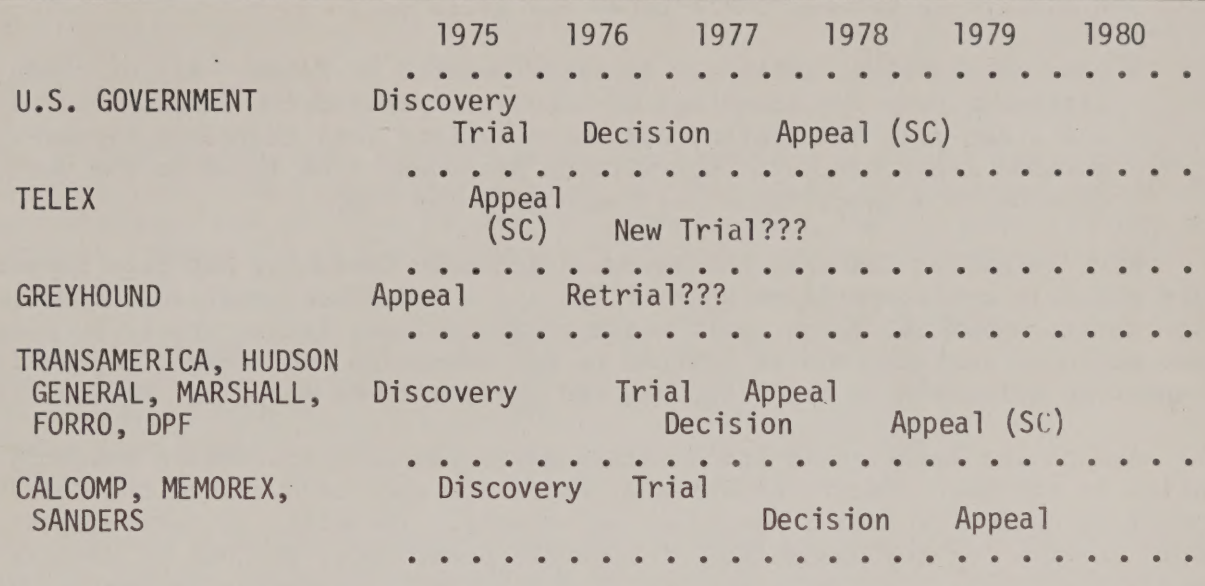
IBM ANTITRUST TIMETABLE*



*Spacing, to indicate timing, is approximate at best. Legal timetables are subject to stretchout. Two events could have significant impact on the cases mentioned above: (1) Hearing of Telex by Supreme Court, and a strong opinion (unlikely) and (2) consent decree between IBM and U.S.

Now, if all goes according to Edelstein's plan, the DOJ trial will start next month with a recess scheduled a month after that to give the lawyers time to complete discovery on issues in the DOJ's amended complaint (the peripheral and third party leasing questions akin to those in the Telex case which arose after the DOJ complaint was filed). The probabilities of a consent decree after May 19 are slim since IBM would automatically be considered an antitrust violator in any settlement thereafter . . . and thus a candidate for private treble damage suits.

A consent decree before then -- which seems more and more unlikely -- would probably mean restructuring the company and, under the Tunney Bill enacted this January, filing of a "competitive impact" statement by the government. Since the statement would spotlight the defendent's monopolistic transgressions, the remedies provided for by the decree, and the avenues of redress for injured third parties . . . IBM might also be reluctant to a pretrial pact.

So the actual beginning of a trial -- half-baked and untidy as it seems it will be -- could well be the most significant event of the computeryear. And when the dust settles after opening, the industry might find IBM -- emboldened by the Telex reversal and not so touchy about antitrust considerations anymore -- more lethal than ever. Meanwhile, the final outcome of the match could be as far away as the computer generation after next . . .

Other forces vs. IBM

Quite a bit other lesser -- though substantial -- litigation is pending, and much of it is called the West Coast Cases. Actually, they are in two camps:

- Telex "tagalong" cases from Transamerica, Hudson General, and other third-party lessors of Telex equipment who claim to have suffered from

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IBM's monopoly. With the Telex case now a questionable precedent, the legal strategy of these litigants now may hinge on their demonstrating a difference between their cases and Telex's.

- Memorex and other cases not directly related to Telex. All of these litigants have the advantage of hindsight perspective insofar as Telex . . . and most have fatter corporate wallets (and therefore higher-powered legal forces). But without precedent from Telex or the Justice Dept.'s case, these may reach into the 1980s.

With no public fanfare, the European Economic Community has been investigating possible anticompetitive acts of IBM . . . and since complaints need not be made public under EEC rules until hearings are called, little should be heard for many months. Jurisdiction is limited to EEC countries and doesn't necessarily connect to goings-on in the U.S.; but EEC is sure to be watching the U.S. scene.

And on the legislative front, hearings on the data processing industry in relation to the Hart Industrial Reorganization Act were held before the Senate's Subcommittee on Antitrust and Monopoly last summer. The bill, as currently drafted, would provide for the assumption of monopoly power under any one of several standard criteria . . . and at least one of these might reasonably be applied to IBM. Chances for passage are slim, at present, since in one fell swoop the bill goes after the automotive, metals, communications, and drug industries in addition to the one IBM is so concerned with. Eventually, however, the answer may well stem from legislative rather than judicial definition.

The case for the defense

IBM has rejoinders for all allegations against it, naturally, and at the root of them lie the questions of relevant market and competitive versus predatory practices. So herein lies the importance of the Telex case . . . it was first decided, then overturned on the basis of those two issues.

It's easy -- and sometimes fun -- to bait a Giant. EDP/IR recognizes, however, that IBM's arguments in its own behalf have a certain fundamental cogency: If the industry is so monopolized, why has IBM been forced to react to competition? How can a company's products form their own complete and closed marketplace? Do only the makers of computer mainframes serve the data processing marketplace -- or are service bureaus, third-party lessors, minicomputer makers also involved? And where is the industry stagnation associated with monopoly?

IBM argues that it's simply survival of the fittest in a game of the highest corporate stakes . . . but others look around, scrutinize the past, and wonder if maybe the deck wasn't stacked. The courts must decide.

Competition from more corners

COMPUTING ADJUNCTS -- SERVICES AND AUTOTRANSACTION -- BECOME ALTERNATIVES

At the recent Adapso Management Conference, the unannounced but recurring theme was that lines of demarcation are disappearing. Increasingly, service bureaus compete with small business computers . . . turnkey systems replace special software packages . . . information appliances do double duty, including data entry. Indeed, the thrust behind strategies from both CDC and NCR (page 5) stems from an appreciation of the business potential inherent in this trend.

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As a result, two major sub-industries of greater than average growth exist within the framework of data processing. Both of these areas -- computer services and autotransaction -- are scheduled for major treatment by EDP/IR during coming months. Both are of growing importance to an understanding of the forces at work in the computer industry.

For several years, now, EDP/IR has analyzed computer services via a 3x3 matrix in which the columns represent type of use (raw power, transaction processing, data base inquiry) and the rows categorize access method (batch, remote batch, or interactive). These can be further simplified, and have the following outlook:

	1974	1979	Growth Factor
Batch processing (all)	$ 1580 M	$ 2425 M	1.5
Remote batch/timesharing	580	1760	3.0
Remote transaction	300	1535	5.1
Remote data base	225	905	4.0
TOTAL	$ 2685 M	$ 6625 M	2.5

The computer services industry today is not very concentrated. The top five companies -- Control Data, Automatic Data Processing, Electronic Data Systems, General Electric, and Bunker Ramo -- account for 20% of revenues. Consolidation is an ongoing activity, however, and by the end of this decade several companies could easily be chalking up $300 million to $500 million of revenues each, with the top 10 companies accounting for half the $6+ billion revenues forecast.

Autotransaction was defined two years ago by IDC to include specialized computer products and services that involve transactions to and from a data base. In general, these products or services have turned out to be those that result in the public's first interface with computers: point-of-sale terminals, automated tellers, reservations services, hotel accounting systems. Another characteristic of autotransaction is that it demonstrates the hardware/software/service competition that exists in many areas.

Unfortunately, even before performance characteristics can be established, regulation of various sorts is being proposed. If it all went through, the projections shown below probably wouldn't be met. EDP/IR sincerely hopes this does not happen. The real benefits of the computer -- as well as potential areas of misapplication -- show up vividly through autotransaction. Safeguards must be established . . . but progress shouldn't be impaired in the process.

AUTOTRANSACTION INDUSTRY -- WORLDWIDE REVENUES OF U.S. SUPPLIERS
(Estimates in $ Millions; Copyright 1975 by International Data Corporation

	1972	1973	1974	1975	...	1979
Batch Transaction (portion)	$ 285	$ 360	$ 440	$ 520		$ 900
Other Autotransaction Services	270	410	565	755		2500
Information Appliances	150	340	540	850		4700
Turnkey Systems	40	80	160	195		1585
Software and Other Products	105	145	200	260		955
TOTAL	$ 850	$1335	$1905	$2580	..	$10640

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GENERAL PURPOSE COMPUTER CENSUS

Counts in the General Purpose Digital Computer (Group A) Census, shown below, are based on the best information available to the International Data Corporation -- but they definitely are estimates. Computer manufacturers, as a rule, do not directly supply this type of information. It is only through the use of IDC's extensive data files and other information sources that estimates such as those in this Census are possible. The computers included in Group A comprise the bulk of digital computers (by value) in operation. These machines are byte or character oriented -- with the exception of large-scale scientific computers that have large words -- and are primarily programmed with higher-level languages. In addition to this Census, EDP/IR publishes a Dedicated Application Digital Computer (Group B) Census that includes minicomputers and specialized-purpose machines.

AS OF JANUARY 1, 1975

NAME OF MANUFACTURER	COMPUTER MODEL	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Burroughs	B-200 Series	$ 5,600	11/61	75	60	135	X
	B-300 Series	$ 5,200	7/65	325	70	395	X
	B-500	$ 6,350	11/68	448	435	883	X
	B-70X/71X	$ 1,300	3/73	220	123	343	200
	B-72X	$ 2,000	4/75	-	-	-	NA
	B-1712	$ 2,100	8/72	220	110	330	150
	B-1714	$ 2,250	8/72	335	188	523	200
	B-1718	$ 3,500	11/74	NA	NA	NA	NA
	B-1726	$ 5,900	2/73	175	53	228	100
	B-1728	$ 8,300	8/73	75	34	109	90
	B-2500	$ 8,900	2/67	185	111	296	X
	B-2700	$ 8,700	8/72	165	100	265	100
	B-3500	$ 16,000	5/67	585	325	910	X
	B-3700	$ 22,600	11/72	85	38	123	70
	B-45/4700	$ 27,300	10/71	170	119	289	75
	B-4790	$ 41,000	11/75	-	-	-	25
	B-5500	$ 35,000	3/63	82	29	111	X
	B-5700	$ 29,500	12/70	22	7	29	X
	B-65/6700	$ 57,500	11/69	85	68	153	25
	B-7700	$120,000	8/73	5	2	7	4
	B-7750	$135,000	9/75	-	-	-	1
	Subtotals			3,257	1,872	5,129	1,040
Control Data Corp.	G-20	$ 19,600	4/61	3	5	8	X
	1604/A/B	$ 42,000	1/60	17	4	21	X
	31/3150	$ 9,100	12/64	83	47	130	X
	3170	$ 19,200	12/70	13	15	28	X
	3200	$ 14,700	5/64	47	44	91	X
	3300	$ 29,900	9/65	110	85	195	X
	3400	$ 23,700	11/64	4	8	12	X
	3500	$ 26,000	1/69	10	17	27	X
	3600	$ 49,000	6/63	13	10	23	X
	3800	$ 53,000	12/65	19	3	22	X
	6200	$ 39,000	11/70	2	6	8	X
	Cyber-72	$ 36,300	10/71	27	39	66	9
	Cyber-172	$ 41,200	6/75	-	-	-	10
	6400	$ 54,000	5/66	60	50	110	X
	Cyber-73	$ 51,700	3/72	17	38	55	11
	Cyber-173	$ 54,600	6/75	-	-	-	10
	6500	$ 74,800	12/67	20	15	35	X
	6600	$119,600	8/64	59	30	89	X
	Cyber-74	$115,500	3/72	5	7	12	2
	Cyber-174	$ 67,500	6/75	-	-	-	2
	Cyber-175	$ 84,000	6/75	-	-	-	2
	6700	$125,000	7/70	3	-	3	X
	7600	$171,600	1/69	14	6	20	X
	Cyber-76	$165,000	3/72	2	3	5	2
	Star-100	$250,000	12/73	1	-	1	2
	Subtotals			529	432	961	50
Digital Equip. Corp.	PDP-6	$ 10,000	10/64	16	8	24	X
	1040/1050	$ 13,300	10/67	181	72	253	20
	1055	$ 22,000	12/71	27	11	38	5
	1070/1077	$ 30,000	6/72	19	3	22	5
	Subtotals			243	94	337	30
HIS	Gamma-10	$ 2,550	7/64	-	975	975	X
	Gamma-30	$ 10,100	2/62	-	140	140	X
	G-5X Series	$ 1,650	1/66	670	3,100	3,770	X
	G-100 Series	$ 4,100	4/66	245	1,470	1,715	X
	G-200 Series	$ 14,000	4/61	170	50	220	X
	G-405/410	$ 9,200	2/68	15	8	23	X
	G-415/420	$ 14,300	5/64	117	182	299	X
	G-425/430	$ 17,350	6/64	33	98	131	X
	G-435/440	$ 22,400	9/65	90	48	138	X
	G-615	$ 56,100	6/69	4	22	26	X
	G-625	$ 66,300	4/65	2	3	5	X
	G-635	$ 81,600	5/65	42	18	60	X
	G-645	$122,400	7/66	2	1	3	X
	G-6025	$ 22,200	11/73	36	13	49	X
	G-6030/40	$ 37,000	6/71	90	116	206	X
	G-6050/60	$ 52,000	7/71	94	55	149	X
	G-6070/80	$ 68,900	7/71	40	14	54	X
	G-6180	$102,000	2/74	3	-	3	X
	G-Subtotals			1,653	6,313	7,966	-
	H-105	$ 2,575	11/71	575	135	710	X
	H-110	$ 2,650	9/68	90	130	220	X
	H-115	$ 5,450	3/70	800	380	1,180	X
	H-120	$ 4,700	1/66	310	140	450	X
	H-125	$ 8,400	12/67	63	260	323	X
	H-200	$ 6,500	3/64	400	200	600	X
	H-2020	$ 2,400	2/73	440	50	490	X
	H-2030	$ 5,150	1/73	85	14	99	X
	H-2040	$ 9,900	4/72	315	110	425	X
	H-1015	$ 12,750	4/71	105	58	163	X
	H-2050	$ 14,800	4/72	190	60	250	X
	H-12/1250	$ 12,700	2/66	275	143	418	X
	H-2015	$ 18,300	2/71	100	55	155	X
	H-2060	$ 21,000	4/72	95	20	115	X
	H-2200	$ 20,000	1/66	115	45	160	X
	H-2070	$ 25,300	5/72	65	11	76	X
	H-3200	$ 27,400	2/70	65	28	93	X
	H-4200	$ 31,600	9/68	25	5	30	X
	H-2088	$ 44,900	4/72	5	1	6	X
	H-8200	$ 74,500	2/69	22	4	26	X
	H-4/1400	$ 13,500	12/61	20	22	42	X
	H-800	$ 29,100	12/60	31	10	41	X
	H-1800	$ 46,900	7/64	7	4	11	X
	H-61/58	$ 1,950	1/75	-	-	-	] 450
	H-61/60	$ 3,300	1/75	-	-	-	]
	H-62/40	$ 3,800	1/75	-	-	-	] 400
	H-62/60	$ 4,300	1/75	-	-	-	]
	H-64/20	$ 7,400	1/75	-	-	-	] 280
	H-64/40	$ 12,700	1/75	-	-	-	]
	H-66/10	$ 18,300	7/75	-	-	-	]
	H-66/20	$ 23,300	1/75	-	-	-	]
	H-66/40	$ 36,200	1/75	-	-	-	] 270
	H-66/60	$ 48,800	1/75	-	-	-	]
	H-66/80	$ 90,000	1/75	-	-	-	]
	H-68/60	$ 70,000	3/75	-	-	-	] 3
	H-68/80	$100,000	1/75	-	-	-	]
	H-Subtotals			4,198	1,885	6,083	1,403
	HIS-Totals			5,851	8,198	14,049	1,403

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AS OF JANUARY 1, 1975

NAME OF MANUFACTURER	COMPUTER MODEL	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
IBM	System/32	$ 900	3/75	-	-	-	5,000
	System 3/6	$ 1,750	12/70	3,100	1,925	5,025	-
	System 3/8	$ 1,900	6/75	-	-	-	150
	System 3/10	$ 2,550	1/70	16,825	7,900	24,725	1,850
	System 3/15	$ 4,650	3/74	1,200	400	1,600	1,800
	360/20	$ 3,675	12/65	2,400	3,960	6,360	X
	360/22	$ 5,900	7/71	575	230	805	X
	370/115	$ 7,450	4/74	850	570	1,420	1,050
	360/25	$ 7,650	10/68	435	825	1,260	X
	370/125	$ 11,250	6/73	1,750	980	2,730	950
	360/30	$ 11,400	6/65	2,685	2,150	4,835	X
	370/135	$ 17,500	5/72	2,750	1,540	4,290	650
	360/44	$ 14,500	7/66	53	75	128	X
	360/40	$ 20,400	6/65	1,275	1,505	2,780	X
	370/145	$ 31,700	7/71	1,925	980	2,905	195
	360/50	$ 32,700	8/65	585	490	1,075	X
	370/155	$ 60,300	2/71	695	450	1,145	X
	370/158	$ 67,500	5/73	635	215	850	325
	360/65	$ 70,700	11/65	430	205	635	X
	370/165	$102,000	6/71	150	70	220	X
	370/168	$126,700	7/73	151	40	191	100
	360/67	$114,200	6/66	33	12	45	X
	360/75	$ 95,900	1/66	32	15	47	X
	360/85	$143,800	10/69	5	4	9	X
	360/9X	$153,000	11/67	14	2	16	X
	370/195	$198,500	3/71	20	4	24	-
	1130	$ 2,350	2/66	2,470	1,800	4,270	X
	1401	$ 3,775	9/60	870	800	1,670	X
	1401-G	$ 2,350	5/64	70	28	98	X
	1401-H	$ 1,325	6/67	25	40	65	X
	1410	$ 17,350	11/61	83	50	133	X
	1440	$ 4,800	4/63	163	168	331	X
	1460	$ 10,000	10/63	50	37	87	X
	1620	$ 2,750	9/60	280	225	505	X
	7010	$ 26,500	10/63	13	7	20	X
	7030	$163,200	5/61	3	1	4	X
	704	$ 32,600	12/55	1	1	2	X
	7040	$ 25,500	6/63	9	15	24	X
	7044	$ 37,200	6/63	8	10	18	X
	705	$ 38,800	1/56	3	3	6	X
	7070-74	$ 27,500	3/60	97	35	132	X
	7080	$ 61,200	8/61	43	1	44	X
	7090/94	$ 71,900	8/60	58	10	68	X
	Subtotals			42,819	27,778	70,597	12,070
NCR	Century-50	$ 2,050	2/71	1,100	220	1,320	275
	Century-100	$ 2,980	9/68	830	950	1,780	X
	Century-101	$ 2,850	10/72	1,000	140	1,140	725
	Century-151	$ 3,500	2/75	3	-	3	100
	Century-200	$ 8,000	9/69	640	390	1,030	X
	Century-201	$ 10,000	8/74	35	3	38	130
	Century-251	$ 10,000	11/73	85	34	119	120
	Century-300	$ 22,600	2/72	40	24	64	10
	304	$ 10,000	1/60	5	-	5	X
	310	$ 1,000	5/61	13	10	23	X
	315	$ 5,000	5/62	310	358	668	X
	315-RMC	$ 11,800	9/65	54	44	98	X
	390	$ 800	5/61	230	142	372	X
	500	$ 1,150	10/65	700	1,410	2,110	X
	Subtotals			5,045	3,725	8,770	1,360
Philco	1000	$ 7,000	6/63	8	1	9	X
	210/211	$ 40,000	10/58	6	1	7	X
	212	$ 52,000	1/63	6	1	7	X
	Subtotals			20	3	23	X
Singer	System 10	$ 2,550	10/70	1,140	810	1,950	400
Standard Computer Corp.	IC-4000	$ 9,000	9/68	4	-	4	X
	IC-6000	$ 16,000	5/67	3	-	3	X
	IC-7000	$ 17,000	6/69	7	-	7	X
	Subtotals			14	-	14	X
Univac	I/II	$ 26,500	3/51	3	2	5	X
	III	$ 26,900	8/62	31	36	67	X
	SS-80/90	$ 8,500	8/58	13	17	30	X
	418-I/II	$ 14,500	6/63	70	63	133	X
	418-III	$ 20,800	7/69	44	55	99	X
	491/492	$ 28,600	12/61	16	12	28	X
	494	$ 44,300	2/66	52	45	97	X
	1004	$ 1,100	2/63	815	740	1,555	X
	1005	$ 1,730	4/66	600	200	800	X
	1050	$ 9,325	9/63	156	140	296	X
	1103/5	$ 37,100	12/50	-	3	3	X
	1106	$ 42,400	12/69	90	135	225	30
	1107	$ 60,400	10/62	6	13	19	X
	1108	$ 72,800	9/65	130	97	227	X
	1110	$ 90,100	6/72	30	42	72	20
	9200	$ 2,530	6/67	1,175	880	2,055	X
	9300	$ 4,300	9/67	875	870	1,745	X
	9400	$ 12,300	5/69	265	297	562	X
	9700	$ 22,900	8/72	10	17	27	X
	90/30	$ 8,700	2/75	-	-	-	350
	1100/20	$ 43,300	4/75	-	-	-	35
	1100/40	$113,300	7/75	-	-	-	25
	90/60	$ 17,200	1/74	85	27	112	150
	90/70	$ 23,300	11/73	42	12	54	80
	Subtotals			4,508	3,703	8,211	690
	301	$ 7,060	10/60	122	6	128	X
	501	$ 17,100	6/59	8	-	8	X
	3301	$ 24,100	7/64	54	-	54	4
	Spectra 70/15	$ 4,200	9/65	11	-	11	X
	Spectra 70/25	$ 7,400	9/65	2	2	4	X
	Spectra 70/35	$ 13,000	1/67	88	5	93	X
	Spectra 70/45	$ 24,000	11/65	242	18	260	X
	Spectra 70/46	$ 40,400	11/68	31	2	33	X
	Spectra 70/55	$ 38,400	11/68	7	2	9	X
	Spectra 70/60	$ 44,500	9/70	19	-	19	X
	Spectra 70/61	$ 50,000	3/71	10	-	10	X
	Spectra 1600	$ 3,800	1/69	65	-	65	X
	Spectra 70/2	$ 12,600	7/71	108	-	108	X
	Spectra 70/3	$ 20,400	10/71	19	-	19	X
	Spectra 70/6	$ 32,200	10/71	45	-	45	X
	Spectra 70/7	$ 39,900	10/71	22	-	22	X
	Subtotals			853	35	888	X
	Totals			5,361	3,738	9,099	690
Xerox	Sigma-5	$ 12,650	8/67	255	59	314	X
	Sigma-6	$ 20,000	11/70	40	8	48	X
	Sigma-7	$ 24,700	12/66	90	23	113	X
	Sigma-8	$ 19,000	9/71	25	9	34	X
	Sigma-9	$ 44,000	11/71	42	8	50	X
	530	$ 3,500	8/73	200	43	243	200
	550	$ 7,525	11/74	25	-	25	75
	560	$ 17,030	11/74	5	-	5	15
	940	$ 24,000	4/66	53	4	57	X
	9300	$ 8,500	11/64	22	4	26	X
	Subtotals			757	158	915	290
	TOTALS			65,036	46,808	111,844	17,333

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• FROM THE FOUNTAINHEAD: NEW ANNOUNCEMENTS BY IBM. The industry Giant -- some say monopoly -- was in the news in recent weeks with a spate of new products and other announcements that are bound to affect the whole industry . . . both short run and long.

First came two new high-end CPUs, one for the 370/158 and the other for the 370/168. The new models, scheduled for first customer shipments in September and June respectively, will come with a high-speed buffer fashioned out of 1K bipolar chips (a first for IBM buffers) double the capacity of old models. According to IBM, these buffers will increase internal CPU speed for most users from 5-12%; and conversion should cause few or no programming headaches. Other features include single-unit shutdown ability previously unavailable for the 158, and a new service processor for the 168 that tracks machine status and provides diagnostic printouts.

Not surprisingly, the new machines cost more than their predecessors: $118K, to be exact, for a new 158 CPU (same memory size) and $298.3K for the 168. Under rental (MAC), it costs $4000 more a month for the 158, $8950 for the 168. Field upgrades for user-owned older models will be available this fall -- at a cost equal to that price differential.

With the announcement, IBM placed the old 158 and 168 CPUs into its "Not In New Production" status and ceased their manufacture. A rundown on some other 370s:

Model:	115	125	135	145	158(old)	158(new)	168(old)	168(new)
Status:	NP	LNP	LNP	LNP	NINP	NP	NINP	NP
Entered:	--	11/74	3/74	11/73	....3/75....		....3/75....	

NP = New Production; LNP = Limited New Production; NINP = Not In New Production

Announced at the same time as the new 370 CPUs was OS/VS2 Release 3. From what IBM says, up to 7 computers can now share the same input, job, and output streams -- and a common pool of peripherals -- under the new release. Available now, the package is designed for use with 370/145s and up.

Second came four new members of the System/3 family -- extending the high end of that line into the price realm of the 370/115. The four new "C Models" of the System/3 Model 15 feature bigger main memories of 160K, 192K, 224K, and 256K bytes . . . and will rent from $3110 to $3710 a month ($125K - $150K purchased). IBM's General Systems Division is shooting for June delivery. Also part of the System/3 spruce-up is a new software package providing the Model 15 with remote job-entry support to a System/360 or 370 operating under HASP, OS/VS1, or OS/VS2 . . . and a feature allowing the S-3 Model 15 to be used with a 3741 Data Station instead of a card reader. The software features will be available in the fall.

The third and perhaps most spectacular new product in the IBM arsenal is an ultra fast laser-optic non-impact printer that can print up to 13,360 lines per minute (45K CPS!). Designated the IBM 3800, the "printing subsystem" operates on-line, has a forms overlay feature, and can print on 8½ x 11 plain paper. For use on IBM 370/145s and up, the printer won't be available commercially for over a year and will cost $310,000 with maintenance another $445 a month plus $2.30 per thousand feet of paper processed. A two-year ETP contract would have the printer costing $6250/month plus the $2.30 charge, simple rental would have it at $7344.

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The system is IBM's first non-impact printer and uses technology similar to that in its copiers. Considering the quantum jump in computer-output capability now available from IBM . . . and the VS connection, the 3800 may be more than just a product line anomaly. EDP/IR will look at the 3800 -- and its place on the IBM mandala -- in a future issue.

The fourth in the news agenda involved the proposed sale of 11 IBM computers (10 System/7s and a 370/158) to the Soviet Union . . . and supplied a little grist for at least one Presidential campaign mill. The computers were for use at Russia's Kama River truck plant east of Moscow, currently being built with the help of U.S. firms. In a fit of detente, the U.S. Department of Commerce okayed the deal and forwarded it NATO for approval. Meanwhile, Henry ("Scoop") Jackson (D-Wash.), who chairs the Senate Permanent Investigation Subcommittee, has called for study of the "precedent-setting export." As of now, the deal -- which includes only those eleven systems and not other high-technology items such as 3330 disk drives -- is in abeyance. IBM currently has only one other computer installed behind the iron curtain: an aging IBM 360/50 at the Ministry of Chemistry.

Fifth and most recently, IBM laconically announced it has "acquired an option to enter into a purchase agreement covering a substantial portion of the assets of Neotec Corporation, Silver Springs, Maryland." The option be must exercised by this June 16th and will cost IBM $5 million for the assets to be acquired. Included in the option are laser-scanning analytical instruments that measure grain, produce, and other products, and a moisture content analyzer. Neotec, incidentally, posted a net loss (unaudited figures) last year of $770,986 on revenues slightly over $3.7 million.

What's tantalizing is the question of "why?" Theories abound . . . and run up and down the scale of cynicism. Some see the IBM option as a logical outcrop of GSD's sensor-based work . . . others see it as a move by defendant IBM to broaden its revenue base on the eve of a trial that is very much concerned with its marketplace. For that matter, maybe it's just a move to out-psyche all the DOJ lawyers, competitors, and pundits that commonly seek to probe the Giant's unspoken mind.

And whether breathtaking or mundane, each bit of news that emanates from the big mainframer is one more still snapshot of a constantly moving entity . . . and, if for no other reason than the entity's size, the character and direction of that movement is important. Hence the "Gray Sheet's" emphasis. It's a fact of life.

• ANOTHER COUNTRY: MINICOMPUTER LAND. Typical of life in this upstart industry is the recent surfacing of Wang Labs, Inc., as a new contender in the end-user small business computer market with three new minis and a printer. A somewhat low-profile vendor of word processors and programmable calculators, Wang says it's shipped 20,000 "computer-based systems to first-time computer users" over the last five years . . . and feels that the service and support expertise picked up along the way gives it an edge in competing with that business-mini crowd, IBM included. The company is also betting on its products' price and ease of applications implementation. As usual, the company claimed to welcome IBM's limelighting of the marketplace with the System/32.

The three computers each come with main memory of up to 32KB and read-only memory of 24K or 42.5KB . . . and are hardwired for the BASIC language. The smallest is cassette-based, the next is diskette-based, and the largest is disk-based (10MB). Various peripherals are available, including the new 65 line-per-minute printer. Prices for the three minis

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in their minimum configurations are $5.7K, $10K, and $29K; the printer costs $5600. Software, which will come from a domestic network of 150 independent vendors, will be customized at user costs ranging from less than $1000 to $17K.

What's significant about the Wang announcement is not so much the new products it tosses into an already chock-a-block business-mini bin -- but the underlying trends it highlights: Service and support as the marketing key, applications software as a part of the end system, a homemade peripheral as new revenue source. Once again there is augury in day-to-day events.

• DEJA VU: HONEYWELL AND CDC. Following by three years the formation of a computer peripherals company by CDC and NCR, Honeywell and CDC have announced another. This time it's to engage "in the design, development, and manufacture of rotating mass memory products" -- meaning disks, drums, and two MICR reader/sorters on the side. Named Magnetic Memories, Inc., it will be 70% CDC's, 30% Honeywell's, and total assets will start about $75 million, employment 5000.

Many see the pooling of resources by these two companies -- both of which watched earnings drop during the last year -- as another sign that the only defense by non-IBMers against the Giant is a united one. For Honeywell especially, this joint venture represents a change from old routine . . . and a spokesman from that company said that there is no reason it couldn't happen again. The question is, how habit-forming are such unions . . . and do they lead to the ultimate joint venture, i.e., merger?

• OLD ROUTINE: HONEYWELL'S IBM "LIBERATOR." It's happening again. A dozen years ago Honeywell launched a fairly successful frontal attack against IBM by providing automatic translation aids for IBM 1401 users that switched to a Honeywell Model 200 in lieu of a more costly upgrade to an IBM 360. Now the company has announced plans to do the same to the IBM System/3. The ammunition Honeywell plans to use is a European-built Level 62 Model 62/40 computer, which will rent in the $2400 to $5400 range.

Also part of the "Liberator/3" program are 96-column card capability, RPG II software compatible with the System/3 RPG, and a direct-read file transfer capability for conversion from System/3 disks to Honeywell disks or diskettes. The Model 62/40 comes with 56K to 96K bytes of MOS memory, multiprogramming, a 140-instruction repertoire, and six I/O channels. It should be interesting to see if Honeywell can repeat history . . . and whether or not IBM users this day and age are so anxious to bolt.

• BETWEEN THE LINES: SYSTEM/32 ABROAD. IBM's World Trade Divisions have now begun introducing System/32 in major foreign countries -- without exactly perpetuating the industry-by-industry approach outlined for domestic 32s at the Atlanta announcement three months ago (EDP/IR Jan.20,1975). "The marketing approach is similar, but each country has its own procedures and is developing its own industry applications programs," says a corporate spokesman, who also stresses the autonomy of the World Trade operation.

Canada is most similar to the U.S., offering packages for construction, food and paper wholesaling, and office products. The U.K. has wholesale food and construction plus several general applications such as payroll, costing, general ledger. This approach is even more apparent in West Germany and Italy -- and Japan offers only its "cross industry applications." It appears that many of these IBM operations -- just like many potential U.S. competitors -- missed the GSD message.

EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MAY 12, 1975 • VOL.10,NO.17 P.J.McGOVERN,PUBLISHER

Handling chores out back -- see page 7

IBM TAKES A GIANT STEP IN COMPUTER OUTPUT
3800 PRINTING SUBSYSTEM ASSAILS XEROX, HONEYWELL, AND IMPORTS

Multiple copy printing, which is dependent on mechanical impact technologies, has about reached its practical ultimate speed. Higher speeds are obtainable with other technologies with multiple copies prepared by serially running the programs or using copiers. In addition, for lower speed printers, significant increases in cost/performance are difficult to achieve with mechanical impact technology.

-- IBM CTC report to MRC, 12/70
from Telex documents

We support Jubilee as a late NS [370], FS product.

-- IBM SDD 1971-1978, Strategic Plan; from Telex 11/71

April '75

So, while Tax Day, 1975, lay heavy on the land -- and the nation's faithful hoped for a quick IRS turnaround with refunds and rebates -- IBM made an announcement that brought light to the quiet revolution going on in computer output . . . the one that might someday change the look of those pastel IRS punched cards so anxiously awaited. With a monstrous "Printing Subsystem" called the IBM 3800, the powerful mainframer served notice on Xerox, Honeywell, and its other competitors that IBM is now in the high speed, non-impact printer business . . . and more, taking aim on the catbird seat.

Trading on IBM's copier technology, the 3800 uses laser and electrographic techniques to produce computer output at up to 13,360 lines per minute (45,000 cps!) . . . and does so on-line. Most of the competition runs off-line.

And in talking to some other manufacturers of non-impact printers, EDP/IR found not only intense interest in the IBM device and healthy respect for the maker's automatic marketplace clout . . . but also a grudging admiration. "It's something, isn't it? Whew," were one spokesman's sentiments.

Though there are other non-impact printers out there already that are faster and certainly cheaper -- such as the Honeywell Page Printer System introduced a year ago (EDP/IR, April 30, 1974) -- none seems to address a market as broad as

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Jubilee's pool of VS 370/145s and up. The 3800 may have been a long time weaning from the lab -- and the first customers won't have their printers for over a year -- but IBM is still at no significant marketing disadvantage. For one thing, the printer is different enough from the competition to be viable; for another, it's made by IBM. Considering that -- and considering the timing of the announcement and the 370-FS product cycles -- the 3800 arrives with more implications than would just another printer from just another manufacturer:

- This is new technology, and IBM's first advance in the high speed printer field in almost a decade: the 3800 can run almost six times as fast as IBM's fastest previous printer. Thus, the monarch has placed the seal of approval on a new, more esoteric way of bringing computer output to humans.

- The 3800 is tied in with virtual storage. Since its product life will probably peak about 1980, it would appear that whatever mainframe hardware IBM chucks into the revenue pipeline between now and then will be compatible in some way with 370 VS operating software.

- The technology can probably be downpedaled to slower, cheaper systems. When IBM chooses to do so will probably depend less on competitive pressure -- from Xerox and the others in the slower speed market -- than on when the company decides its own 1403 impact printer customer base is ready for a change.

- The technology here may not be confined to computer output . . . applications in reprographics may also exist. Futuristic visions of word-processing, reprographics, computer data base management, and electronic mail all intertwining are no longer quite so "blue sky."

The moving beast . . .

Detailed technical descriptions of the 3800 can be found elsewhere, so EDP/IR wont dwell on them. Basically it uses a rotating drum with a continuous sheet of photoconductor on it for the printing . . . and a laser and flashing lamp (used with the forms negative) for writing on the photoconductor. The drum rotates at a fixed speed, hence paper feeds at a constant rate (31 yds/min) and output rate depends on the line spacing. Various character fonts and sizes are available, including OCR and a formatting set for printing simple forms. More complicated forms can be printed using negatives and a forms overlay feature.

According to IBM, the 3800, which runs under OS/VS1 and OS/VS2, will require little or no modification to run under existing impact printer software. The machine also has a feature that allows for inputting certain variables -- such as customized labels, addresses, etc. -- locally.

For the cost-harried user -- not to mention ecology buffs -- all this technology has some clear, immediate benefits:

- The 3800 uses plain, fan-folded paper. The cost per sheet is significantly less than the treated paper used in the Honeywell PPS, about the same as the Xerox plain paper sheets.

- Output can be printed in 8 1/2 x 11 inch pages, cutting paper and handling costs up to 40% from those on the regular 11 x 14 7/8 inch compu-

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ter printouts, according to the company. For printing the small page size, the 3800 has to use a 15 characters-per-second font.

- Copies on non-impact printers are printed serially, meaning no carbon paper is used (carbons cost about as much as plain paper), and forms handling requirements -- with bursters and decollators -- are less.

- The forms overlay feature should reduce the use of continuous forms at some sites. Continuous forms (stock and custom) average about $12 per thousand. But even Honeywell's coated paper runs only about $7 a thousand, and plain paper's even cheaper. It's not unusual for large computer sites to print several million pages a month.

- Though costs are high for a high-speed non-impact printer, it's quite possible they may replace more than one printer at sites with multiple computers and/or multiple printers. With the onslaught of data base computing resulting in consolidation of CPUs, some such consolidation of peripherals seems inevitable.

. . . and the forest

With regard to Jubilee [IBM 3800] range competition: (a) We consider Xerox the real competitor in this area. A judgement has been made that Xerox will pursue both the medium and high speed printer markets starting with the former . . .

-- IBM OEM Forecast Memo, 12/18/70
from Telex documents

In a sense, IBM was right. Xerox at the moment holds an established lead in the market for high speed non-impact printers used with general-purpose computers. The first Xerox 1200s were shipped in late 1973.

But the 3800 is much faster, and head-to-head it would seem to compete more with the Honeywell system . . . or even the Hitachi-Uppster model soon to be in production. Indeed, one Xerox salesman contacted by EDP/IR said he didn't feel that his company would be competing in quite the same market as IBM and, after an appreciative whistle for the IBM gear, said, "It's the same with a lot of people, we just don't have that much firepower." At any rate, a comparison of the several systems that seem to compete most with each other is provided on page 4.

Oddly enough, IBM may find some competition from printers normally used in other fields -- e.g. plotting, direct mail publishing -- and, not so oddly, from foreign manufacturers. A rundown on the non-IBM players in the field:

Honeywell -- claims to have more than a handful of PPSs installed already . . . initial customer shipments having started about 60 days ago. And, according to HIS, the system is up and running in a variety of environments . . . including at least one site with an IBM computer. The company feels that its backlog for the PPS is higher than planned and expects to enter volume shipments soon.

Xerox -- had over 200 of its printers installed as of last count by International Data Corporation, publisher of EDP/IR. Though early users of the 1200 reported some startup problems, in general they seemed quite happy with the equipment . . . some very happy. One drawback some users noted was that they found themselves "copy-rich" . . . that is, that it was easy to make too many copies.

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HIGH SPEED NON-IMPACT PRINTERS

	Honeywell PPS	IBM 3800	Xerox 1200	Uppster II
Technology:	Electrostatic	Laser-electro-photographic	Xerographic	Flash-lamp
On or off-line:	Off	On	Off	Up to OEM
Paper:	Treated-roll	Plain-fanfold	Plain-sheet	Plain-fanfold
Copies:	Any number, 32 collated	Software control	99	Dial or soft-ware control
CPI:	10, 12.25	10, 12, 15	12	12
CPL:	96, 132	136, 163, 204	132	132, 160
Lines/inch:	4, 6, 8, 10	6, 8	8	8
Lines/page: (8 1/2 x 11)	34, 51, 68, 85	51, 68	66	62
Print rate:	12 or 18,000 lpm	13,360 lpm	4,000 lpm	9200 lpm
Date ship:	4 Q 74	3 Q 76	4 Q 73	3 Q 75

Shortly after the IBM release, Xerox responded by announcing 1200 compatibility with output tapes from Burroughs and Honeywell systems in addition to IBM and Univac compatibility introduced earlier. EDP/IR wouldn't be surprised to see Xerox ship 300 printers this year . . . many more, probably, than Honeywell.

Uppster -- after seven years in the development stage, will finally ship its first Model II printer this month. Behind the U.S. company -- formed solely for the purpose of producing this printer -- is the wealth and industrial might of the Japanese mainframer, Hitachi. Uppster's original contract with Hitachi calls for the foreign firm to manufacture 1000 of the printers for OEM sale in the U.S. and for use with Hitachi's own computers. A spokesman for Uppster would give no firm numbers to EDP/IR on order backlog, but did admit gleefully that Uppster and Hitachi were in negotiations over the second manufacturing run. Cost to OEMers for the Uppster machine is quoted at $40,000 in quantities of 100 or more.

Mead -- has perhaps the most astounding printer of them all: a machine that can crank out 45,000 lpm when pressed. Using inkjets -- in sort of an active version of the electrostatic process -- the Mead Dijit, as it is called, is really more of a graphics and business forms imaging system. Two of the behemoths are in the process of being installed now, and the company is actively seeking customers. The systems can only be leased, and firm prices aren't available yet, but a spokesman told EDP/IR they would run in the vicinity of $8-10,000 a month. It's a sign of the times, perhaps, that the first applications for the Dijit will be in direct ("junk") mail printing.

Gould -- offers a plotter that can also be used for more mundane computer output that operates at 4000 lpm. Major markets for it, however, lie in the mini-computer industry and at older, smaller (such as IBM 360) general-purpose computer

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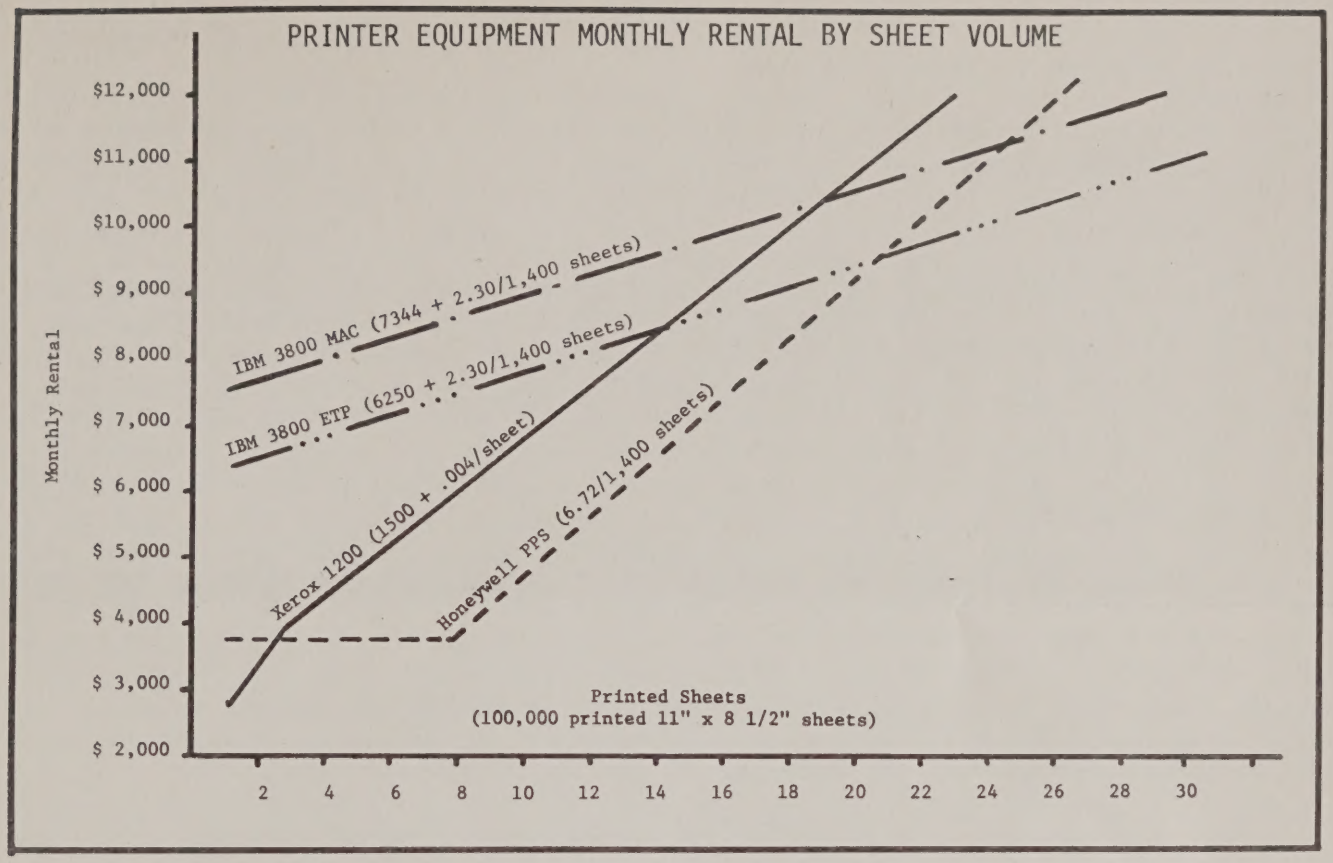

sites. However, EDP/IR's press contact did report that, in at least one instance, a customer was obtaining a Gould 4800 to use until an IBM 3800 could be installed.

Canon -- another Japanese firm, will debut a 4000 lpm non-impact printer at the upcoming National Computer Conference next week in Anaheim, CA. Details are sketchy, but the model -- a prototype only -- will operate off-line from magnetic tape input and will have the capability of outputting paper of various sizes, including 8 1/2 x 11. In Japan, Canon is known for its cameras, copiers, micrographics and programmable calculators. Its U.S. subsidiary is Canon, USA, Inc.

Who's gonna buy?

The printer market is one of the few peripheral equipment areas where IBM's mainframe hegemony has held up. At large-scale sites -- where the monthly computer bill (including for multiple systems) runs $40,000 or more -- two thirds of the printers have IBM nameplates.

But studies and data file analysis by IDC indicate that IBM will not carry as much weight in the non-impact printer business. At least not by number. Indeed by 1980 more of the non-impact printers -- about a fifth of all printers at large-scale sites by then -- will be made by IBM competitors than not. The chart on page 6 gives a rough cut at what EDP/IR feels will happen in the non-impact market between now and then.

Not shown is the number of sites with three or more printers . . . which represent those sites with high and burgeoning volumes of print -- likely candidates for ultra-high speed printers. By 1980 they should number 8000 and comprise about half of all large-scale computer sites.

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High Speed Printers (>3K lpm)	1974	1976	1978	1980
Non-IBM installed	200	1000	2200	3600
IBM installed	0	100	900	2200
Large-scale Sites (U.S.)	2800	3400	4200	5000

The revenue picture is more cloudy. While each IBM machine will bring in more money -- at least at the whopping price announced -- than its competitors, each may also displace at least one IBM printer. To make forecasting even harder, revenue also depends on the amount of output produced. But a gross "ballpark" estimate shows that the hardware being shipped over the next five years will be worth more than $1.5 billion at U.S. sites alone.

Bells and whistles

At first glance at the IBM 3800's price, it looks like the off-line boys can look forward to some pleasant days in the price-umbrella shade. Both potential customers and competitors seemed as agog at the 3800's cost as they were at its more mechanical characteristics. With monthly rentals under MAC starting at $6250 -- and the usage charge could easily equal that in a high-volume operation -- it could cost more than a 370/125. Its purchase price is $310,000, independent of the usage charge -- which you must pay if you want IBM maintenance.

Much of that cost is undoubtedly in the software. And if some see the 3800 as overpriced and an easy target for competitors as a result, that software also means this: only IBM stands to enhance its mainframe sales with its printer. If the 3800 is just another set of "bells and whistles" to hang on a VS 370 -- or on a VS "FS" computer -- bells and whistles may be just what the doctor ordered.

There are drawbacks to on-line operation, however, and IBM didn't address them in the announcement. Users queueing up for their 3800s are being advised by the off-line competition to ask these questions:

+ How much will the printer really tie up my CPU?

+ How do I provide backup . . . with the same output format?

The Tokyo connection

The Telex documents never mentioned the Japanese computer mainframers as a threat in the non-impact printer market . . . but neither did they discuss the possibility of a Japanese plug-compatible CPU (via Amdahl and Hitachi).

But with the Hitachi-Fujitsu stake in their souped-up IBM copies, the M-180 and M-190 computers . . . with respectable Japanese copier technology at hand . . . and with the peculiar nature of Japanese written language . . . it's not too far fetched to envision major inroads into domestic computer rooms by our western neighbors. Who knows?

For now, though, it's Xerox, Honeywell and IBM . . . and Xerox and Honeywell workable "birds" in hand, especially Xerox. But when IBM finally coaxes Jubilee out of the "bush" in 1976 -- perhaps in time for some major new computer announcements -- then the users will have to decide who gets the catbird seat.

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SUPER COMPUTER DESIGNER ANNOUNCES BACKEND PROCESSOR

In a block diagram of an IBM data processing configuration, the 3705 stands out as an important element. This IBM processor -- handling chores a minicomputer might handle elsewhere -- takes a large processing load off the CPU(s). As a special-purpose processor, it does one job much more efficiently than the CPU could.

Now, a computer designer of significant stature has proposed the use of a similar device at the back end -- between the CPU and the growing hierarchy of mass memory devices, both announced and anticipated. To back up his vision he's designed a family of products to relieve the file management problem at multiple mainframe sites . . . and initial prototype deliveries will start soon.

The man -- James Thornton -- heads up Network Systems Corp., the company he founded to fill this need. Thornton first appeared on the scene working for Seymour Cray on the CDC 6600 and some on the 7600 . . . then drifted into pursuing the use of integrated circuits and semiconductor memory in large-scale, very fast computer systems. After coming up with the STAR 100, he left to organize NSC.

Backend flexibility

With a Network Storage System -- composed of a master processor, slave processors, memory, channels, and adapters as needed -- Thornton says users can interface "anybody or anything" to a central CPU complex . . . and he talks about "relieving the traffic management congestion problems" that arise in a multiprocessor environment utilizing one 100 to 200 disk drives.

NSS, he says, will increase throughput (by reducing CPU tie-up at slow disk drive data transfer rates) at today's installations . . . and provide an outlet for new storage technology research with current systems. ("If we don't take this step, it will very much inhibit the introduction of new drives.") What's more, NSS fits in snugly with IBM's 3850 -- the first of the steps Thornton thinks the Giant will take toward separated data management products.

The price tag on NSC equipment is steep . . . depending on what you get and how you look at costs. An adapter for a commercial installation (fall deliveries) will run between $15-30,000; a full-blown control unit (prototypes in January) with 128K bytes of 100 NS memory running at 4 million instruction/second could cost $350,000. Eventually, a system -- complete with sophisticated software -- is planned and will be priced in the one-half to two million dollar range.

Who might want it? The Atomic Energy Commission and the Defense Department for starters. Then, says Thornton, timesharing firms, banks, insurance companies.

What about IBM? "We have a certain amount of time before the sleeping Giant comes in . . . IBM today is selling 168-level machines to perform these tasks, and I believe will move toward such a product along its own plans, not because some upstart might take a little business away." Thornton also claims that NSS isn't a replacement product but one that's added at upgrade time. (EDP/IR sees where it could cut into some of IBM's upgrade equipment . . . but perhaps stimulate offsetting sales of mass memory products.)

Is it possible for a small fry to preannounce a product that IBM will eventually promote? Possibly. Certainly Jim Thornton thinks so. And meanwhile, the network control unit for NSS will be some dedicated application. Yow.

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• THE "PERSONAL TOUCH" TAKES ANOTHER BEATING AT THE HANDS OF PROGRESS with the announcement by Redactron that its word-processing system can now access Telex, TWX, and mailgram networks -- as well as computer data banks -- using high speed data lines. But gone also with the personal letter, according to the company, is all that rekeystroking that word-processing, data processing, and mail transmission usually requires. Redactron alleges it already has $3.5 million in orders for its multifunction system from the likes of Western Union, ATT, Standard Oil, Honeywell, The U.S. Treasury, The U.S. Navy and others.

• HOPING TO CUT THE BULL OUT OF RUMORS ABOUT HIS COMPANY, Clarence W. Spangle, president of Honeywell Information Systems, told stockholders at Honeywell's annual meeting that his company is talking to France's computer conglomerate, CII, about the possibility of merger. For an undetermined cash sum, explained Spangle, HIS would reduce its holding in Honeywell Bull to less than majority . . . and hopefully expand its foreign customer base while reducing its exposure. The details are still not worked out and the deal could fall through any time.

Then in Beantown (Boston, MA), HIS took another tack -- at an in-house conference dubbed "Minisystems '75." Here the company focused attention on its strengths and hopes in the minicomputer arena -- which is where many expect Honeywell is currently looking to buttress its computer business. Also, just before the conference, Honeywell stepped up efforts in the small business end, by announcing "Liberator/3" for IBM System/3 users . . . and a modification to the Series 60 Model 61/60 small transaction processing computer that brings its cost to under $2000/month on a five year plan. The 61/60 is an entry-level system on a par with the System/3 Model 8.

• MAYBE NOT MA 'N PA STORES, but at least small and medium size supermarkets will now be able to avail themselves of IBM's POS electronic checkout systems. At the Super Market Institute's annual convention the mainframer announced its 3660 supermarket system could now come key-entry based. The system -- designed for stores with annual sales from $1 - $2 million -- allows for local product identification through use of a "velocity code" which can be used for checkout. Code numbers and corresponding pricing information are maintained by the system's in-store controller. A system with six terminals, a controller, and a communication's unit will cost just over $40K; first deliveries are a year off.

• NOT TO BE OUTDONE BY ANY JOLLY GREEN GIANT, Singer announced a new modular approach to supermarket electronic checkout with a new Model 942 Terminal. An up-and-coming grocer can start with an electronic cash register . . . then add a Singer mini for an in-store controller with limited management reporting and ability to handle eight terminals . . . then add a Singer "maxi" in-store processor with disk and 32-terminal and communications capability . . . then finally reach the pinnacle with a dual "maxi-super" scanning system, which features a backup processor, the UPC scanners, and a console/printer.

• RELEASING NEW SOFTWARE - SOME WITH HARDWARE ATTACHED -- Sperry Univac headed for the factories and the thrifts. The "UNIS/90 System" is a modular, data base-oriented software product for computerized production and inventory control . . . which will be issued in modules to willing Series 90 and 9000 customers operating under OS/4. For small and medium size thrift institutions, the 9480 Financial Systems will come in two hardware configurations and feature "PROFITS" software. The larger system, the F1, with a separate printer and card reader costs $354K. Included: 131K memory, two 9-track tape units, and three 8414 disk units.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MAY 19, 1975 • VOL.10,NO.18 P.J.McGOVERN,PUBLISHER

Bankers Convention

EFTS (R)EVOLUTION INEVITABLE, SAY BANKERS BUT MAJOR MARKETS FOR COMPUTER INDUSTRY ARE NOT YET REALITY

> Such concepts as EFTS and the regional automated clearing house are but forerunners of what is to come -- the tip of the iceberg, to use a cliche. Paperless transfers of payroll, dividend, welfare, and retirement payments are standing in the wings. Beside them wait paperless payments of periodic bills -- mortgages, loans, insurance and even direct debiting of individual checking accounts at retail points of purchase. If we can ever learn how to market this to our customers, the size and scope of the possibilities boggle the mind.
>
> -- Richard D. Hill, Chairman, First National Bank of Boston
> ABA 1975 National Operations and Automation Conference

The three-piece suit and watch fob set met in Florida last week to examine the modish happenings going on in their industry -- banking -- and amidst the atmosphere of great and radical changes that the prospect of Electronic Funds Transfer Systems portend for them . . . the feeling exuded by the speakers and session heads at the American Bankers Association's 1975 National Operations and Automation Conference was one of careful consideration of the phenomenon . . . and an aversion to rushing headlong into anything so new, so different, and so costly.

But the ABA represents commercial banks only (about 98% of the 14,000 total) . . . and their competitors are to be forgiven if they interpret this reticence to move ahead willy-nilly as just another aspect of bankers' conservatism in the face of the new forces of consumerism and technology soon to sweep the industry.

Still, the debate seems to center on the question of how and when EFTS will become a reality -- not on its inevitibility or impact.

And, as if to underscore that inevitability -- and perhaps a need for the banking industry to move surefootedly and soon -- National BankAmericard, Inc, announced that by next fall its member banks will be able to issue a new "asset" card . . . for use in authorizing customer transactions against deposit account balances rather than credit lines. Though this doesn't constitute EFTS, it does set the stage for it, and NBI -- along with its Mastercharge rival, Interbank Card Association — are not federally insured institutions and are thus immune to any moratorium on EFTS experiments effected by Congress. So EFTS is indeed on its way.

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EFTS TIMETABLE: A FISHER'S EYE VIEW

One of the early speakers at the ABA convention was John F. Fisher, Vice President of City National Bank and Trust Company, Columbus, OH. Among the topics he covered was the following timetable for EFTS. Implicit is a message to his confreres that, when it comes to coping with EFTS, communication is paramount:

1972-3 -- "Fans in the Stands" Period. (Much Yelling, little actual yardage). This period saw the introduction of plastic cards and the controversy over magnetic versus embossed character reading. Begins the standards hassle.

1973-4 -- "Blaze on Every Tree" era . . . with EFTS activity going off in all directions. Much quibbling and controversy over what to do and where to go gets laid to rest by the Hinky Dinky experiment and the Citicorp Magicard.

1975 -- "The 97¢ Jug of Muscatel" period. Marked by short-term heady exploits (like the NBI "asset" card and supermarket check authorization), this era will see short-term attacks rather than design of a national system. Interchange of deposits through shared facilities will also be part of the intoxication.

1975-76 -- "Hair of the Dog" era. Partly as the culmination of litigation and legislation, the industry will have to sober up to the realities of EFTS, both socially and economically, and the ramifications of paperless banking.

1976-7 -- The Age of "X-Rated Adulthood." By now, the idea of common, shared facilities will be better accepted, POS systems will be in place -- and part of the national EFTS net -- and the pivotal issue of third party deposit will be at work reweaving the competitive fabric of the banking industry.

Meanwhile, the technology-driven computer industry -- accustomed to change at a more hectic pace -- chomps at the bit . . . with individual suppliers jockeying for position while remaining as flexible as possible, in case of legislative or otherwise inspired midcourse shifts in the payments system evolution:

- The mainframers are taking the modular tack, limiting only their Autoteller/Cash Dispensers to strict EFTS applications. Their hardware is general-purpose and ready to be configured by the users, bankers or not.

- ATM suppliers are merely trying to line up individual banks, not large single orders, hoping to gain as much exposure as possible . . . for when the floodgates open and the banks start ordering in earnest.

- Other specialized systems and service suppliers are hovering at the fringes . . . with related DP activity, but no actual EFTS.

What that means to the computer industry, according to EDP/IR's publisher, IDC, is this: Though the bankers are sure to find a confusing array of helping hands when the time comes to implement full-blown EFTS networks . . . for the next two years, at least, no major new computer markets will open up.

In fact, numbers garnered by IDC's Corporate Planning Service in a status report on EFTS reveal that "the only real computer industry market -- albeit small -- that has emerged from the EFTS evolution to date is the cash dispenser/ATM sector." The chart on page 3 shows the year-end 1974 standings in that market (a submarket of the EFTS/Banks/Credit segment of information appliances, also shown.)

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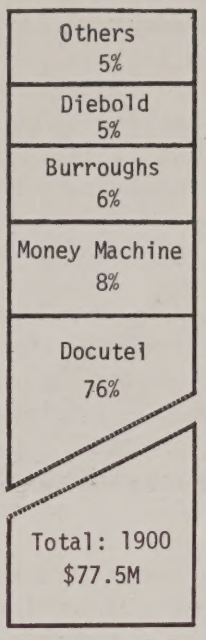
INFORMATION APPLIANCES
($ Million)

	1974	1975	1977	1979
POS	340	490	800	1200
Banks, Credit, EFTS	125	160	400	1000
Ticketing, Stock Quote, Other Special Terminals	75	200	1000	2500
TOTAL	540	850	2,200	4,700
Information Appliances as % of Keyboard Terminal Shipments	36%	42%	57%	72%



Automatic Teller Machines/ Cash Dispensers:

Installed Base, Year-end 1974

The bankers vs Newton's Law

Other than the highly visible POS and Autoteller applications of EFTS, there is really only one area of banking that is moving from paper to electrons in any organized fashion: The Automated Clearing House.

ACH's accomplish electronically what Clearing House Associations have been doing manually for years and here -- because of the eradication of tons of paperwork -- is where the banking industry has perhaps the most immediate to gain by EFTS. Where once representatives of the major banks sat down several times a day to exchange bundles of checks -- while the FED ferried interdistrict checks about via private plane, couriers, etc -- computers and data lines could do as well.

And it seems that here is where EFTS is making its most substantial inroads. There are several understandable reasons for this:

+ The ACH is an organic outgrowth of an existing system and its establishment offers those immediate savings in paperwork costs; under the services often proffered by the ACH -- such as direct payroll deposit -- the time saved by automation means an extra day or two of "float" for the bank; and the ACH is an internal system, one still somewhat comfortably under the bankers' purview.

+ At $30,000 a whack ATMs offer little advantage to a bank unless shared (at airports, subway stations, etc.) or on-line -- which requires a mammoth investment in home-office software and DP development. Though

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a primary advantage of using ATMs is the extension of services into new areas, at much less than the cost of a branch, current controversy over what is and what isn't a branch has had a cooling effect on their spread. To date, commercial banks have mainly seen ATMs as a necessary defense against the S&L competition.

+ POS implementation -- check authorization, debit card use -- has many of the same drawbacks as ATM use, plus the added hassle over who pays for what (grocer or banker) and the almost imperative sharing of facilities; interfacing the EFTS and POS system harmoniously can also be a problem.

Further roadblocks

"What's standing in the way," says the IDC report, is not the technological problems -- the equipment, communications, software, and even plastic cards are all here -- but "primarily a fearful anticipation regarding the changes EFTS may effect on the nation's banking structure -- indeed, perhaps the whole structure of our economy." Out of the legislative morass within which the banking system operates -- and which is trying to accommodate the changes it perceives will arise through EFTS -- have come two especially controversial developments:

- A congressional call for a moratorium on EFTS experimentation with ATMs and POS devices until December, 1976, retroactive to December, 1974. The moratorium ironically wouldn't affect early EFTS experimentors or non-federally insured outfits like NBI or Interbank. It's an attempt to keep EFTS tinkering from unlidding a Pandora's box.

- A Comptroller of the Currency ruling that customer-bank communications terminals do not constitute a branch bank (the banking is done at the home office, not where the electronic signals originate) -- and as such are not bound by branch banking laws. Most recently, he slapped a 50-mile geographical limit on the installation of CBCTs -- unless those CBCTs are available to be shared.

Into the breach?

Though no new major computer markets may appear before EFTS reaches Fisher's "X-Rated Adulthood," there is still room for the autotransaction/services sector to get into the act. ATM suppliers estimate that 50% of their products are used on-line now, and 75% of those being shipped will be. Each on-line system means software at the home office (setting up a bank's Central Information File is akin to other businesses' data base management projects) or services in its stead.

And the suppliers are begining to move. TRW's FDS/i, for instance, has just come out with a half on-line, half off-line turnkey system for banks to install before going fully on-line. It uses a TRW 4000 processor and disk and/or tape files at the branch which are updated daily from the bank's central computer. From then on during the day -- to the tellers and the customers, at least -- the branch operation appears to all intensive purposes to be on-line.

Undoubtedly there will be more. And the aggregate effect of this computer industry leaching through the banking industry -- swelled by cutomer wants and expectations -- bodes well for the one industry, change for the other. Says John E. Dean, the man behind the Hinky Dinky experiments in EFTS, to his fellow bankers: "Anyone who says the consumer doesn't want EFTS speaks from conjecture and fantasy."

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DEDICATED APPLICATION DIGITAL COMPUTER CENSUS

The data below was compiled from the best information available to International Data Corporation; questions or comments should be referred to Chris Whichard, the Census Editor. Dedicated Application (Group B) computers are those commonly referred to as minicomputers, plus certain larger systems designed primarily for a single application such as process control, data communications, and data entry. Group B computers -- though general purpose by design -- are typically word oriented (8, 12, 16, or 24 bits per word), usually sold outright, and predominantly programmed in machine language. Exceptions in all cases do occur, however . . . and, it seems, more and more often.

Indeed, definition is becoming increasingly difficult, and subjective judgement is necessary. For example, office accounting computers such as Burroughs' E and L Series or TC-500, NCR's 399, Nixdorf's 820, and Singer's 5800 are excluded; Among those included, however, are "data entry" oriented machines such as the Eldorado 140, Four-Phase, and MAI's Basic/Four since they compete with other "minis" yet do not fit EDP/IR's definition of General Purpose (Group A) computers. Another anomaly is IBM's System/32 -- which EDP/IR has classified as a low-end Group A computer.

Price Classes: (1) $25,000 (2) $25-50,000 (3) $50-100,000 (4) $100,000; Average System Value

AS OF JANUARY 1, 1975

NAME OF MANUFACTURER	COMPUTER MODEL	NOTES	BITS PER WORD	PRICE CLASS	PURCHASE PRICE ($1,000) BASIC	PURCHASE PRICE ($1,000) AVERAGE	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Adage, Inc.	AGT-10 Series			4	100	165	4/68	32	3	35	X
	AGT-100 Series			4	30	37	1/72	20	15	35	1
	300			4	30	37	3/74	10	2	12	5
	400			2	30	37	3/74	6	-	6	3
Apeco (Cascade)	80/20	*	8	2	28	35	1/70	]	]	]	]
	80/30	*	8	2	31	40	1/70	] 215	] 10	] 225	] X
	80/40	*	16	3	46	57	1/70	]	]	]	]
Autonetics	Recomp-II		40	4	95	127	11/68	30	5	35	X
	Recomp-III		40	3	65	94	6/61	7	2	9	X
Bailey Meter	750		25	4	40	110	6/60	38	15	53	0
	755		25	4	80	130	11/61	7	2	9	0
	756		25	4	90	150	2/65	17	12	29	0
	855/15		16	4	24	133	12/72	1	4	5	10
	855/25		25	4	100	400	4/68	16	0	16	0
	855/50		25	4	100	400	3/72	4	0	4	8
	955		16/32	4	250	750	10/75	-	-	-	4
Bendix	BDX-6200		20	3	25	60	5/70	40+	0	40+	NA
	BDX-9000		16	1	6	15	/71	8+	0	8+	NA
Bunker Ramo	130		15	3		90	10/61	160	27	187	X
	133		15	4		108	5/64	79	9	88	X
	230		15	4		134	8/63	15	2	17	X
	300		29	4		275	3/59	18	5	23	X
	330		29	4		275	12/60	19	7	26	X
	340		29	4		375	12/63	19	3	22	X
	1018		18	1		23	12/71	NA	NA	NA	NA
Cincinnati Milacron	CIP-2000 Series	a	8	1	4	12	7/69	550	0	550	NA
Clary Data Corp.	404	*	16	2	6	30	1/70	110	22	132	NA
Collins Radio	8311			1	15	17	1/68	53	16	69	X
	8400			4		950	11/62	25	8	33	X
	8500		32	4	200	1,000	1/67	53	16	69	X
Compiler Systems Inc.	CSI-16		16	1	11	20	11/70	80+	0	80+	NA
	CSI-24		24	2	13	30	12/70	30+	0	30+	NA
Computer Automation Inc.	108/208/808		8	1	5	11	4/68	280	30	310	X
	116		16	1	8	16	8/70	145	25	170	NA
	216		16	1	8	20	7/69	350	45	395	X
	816		16	1	10	15	12/68	40	5	45	X
	Alpha-8		8	1	3	4	5/72	]	]	]	]
	Alpha-16		16	1	4	9	10/71	] 1,830	] 425	] 2,255	] NA
	Naked Mini-8		8	1	2	3	5/72	]	]	]	]
	Naked Mini-16		16	1	3	7	10/71	] 1,900	] 380	] 2,280	] NA
	Alpha-LSI		16	1	2		12/73	]	]	]	]
	Other							1,200	350	1,550	NA
	Subtotal							5,745	1,260	7,005	
Computer Development	CD-2000		8	1	7	10	8/70	NA	0	NA	NA
Computer Logic Systems	CLS-18		18	1	9	14	3/71	NA	0	NA	NA
Computer Signal Processors	CSP-30		16	3	35	80	6/70	25+	NA	25+	9
	MAP		32	1	14	25	6/75	-	-	-	NA
Comtec	CT/90		16	3	50	85	1/72	NA	0	NA	NA
Comten, Inc.	10			1		17	7/69	80	0	80	NA
	20		16+2	3		80	3/71	100	0	100	NA
	40		32+4	4	125	240	8/69	40	0	40	NA
	60		32+4	4	150	365	9/69	30	0	30	NA
Consultronics (Sc. Control Corp.)	600 Series		24	3	31	80	10/65	230	0	230	X
	4700		16	3	13	72	4/69	18	0	18	X
	DCT-132		8	2	28	36	5/69	75	65	140	X
Control Data Corp.	160		12	4	60	112	5/60	49	11	60	X
	160-A		12	4	90	225	7/61	200	65	265	X
	160-G		13	4		535	3/64	34	1	35	X
	924/A		24	4		430	8/61	26	1	27	X
	1700		16+2	4	37	160	3/66	290	180	470	X
	1700-SC		16+2	3	20	60	9/70	150	130	280	X
	System 17		16+2	2	14	39	2/74	44	93	137	NA
	8090		12	3		90	5/64	116	89	205	X
	8092		8	3		67	8/64	56	14	70	X
	G15		29	3		61	7/55	265	30	295	X
	LGP-21		32	2		42	12/62	140	33	173	X
	LGP-30		32	3	49	59	8/56	290	43	333	X
	RPC-4000		32	4	87	101	10/60	61	12	73	X
	CSC-46/136/636		15	4		280	/54	27	3	30	X
	Elbit-100		12	1	6	8	6/67	5	445	450	X
	Cyber 1000/M-1000		24	4	250	365	/68	36	15	51	NA
	Subtotal							1,789	1,167	2,956	
Datacraft Corp. (Harris)	6024-1		24	4	51	135	5/69	20	0	20	X
	6024-3		24	3	32	90	2/70	140	30	170	NA
	6024-4		24	3	24	100	8/73	33	3	40	10
	6024-5		24	2	16	50	5/72	165	5	170	5
	Series 100			3			10/75	-	-	-	NA
	Series 200			4			10/75	-	-	-	NA
Data General Corp.	Nova		16	1	6	13	2/69	750	620	1,370	Neg.
	Nova-800		16	1	7	17	3/71	1,170	250	1,420	145
	Nova-820		16	1	6	16	4/72	730	170	900	115
	Nova-840		16	2	16	30	7/73	510	140	650	100
	Nova-1200		16	1	5	10	12/70	3,690	870	4,560	400
	Nova-1210/1220		16	1	4	10	2/72	3,040	830	3,970	400
	Nova-1230		16	1	7	11	12/71	260	70	330	50
	Supernova		16	1	9	21	4/70	180	80	260	Neg.
	Supernova-SC		16	2	17	30	6/71	300	100	300	20
	Nova-2/4		16	1	3	7	10/73	670	195	865	200
	Nova-2/10		16	1	4	8	10/73	580	195	775	175
	Eclipse-S/100		16		9		2/75	-	-	-	150
	Eclipse-S/200		16		16		2/75	-	-	-	100
	Eclipse-S/300							-	-	-	50
	Subtotal							11,780	3,520	15,300	

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Lockheed Electronics	MAC-16		16	1	11	22	3/69	31+	35	350	X
	MAC-Jr		16	1	8	16	1/71	1,200	✓ 220	1,420	125
	Sys-1111		16	1	6	10	5/72	475	75	550	100
MAI - Basic/Four	Basic/Four	*	8	2	34	46	8/71	850	750	1,600	300
Memorex	MRX-40	*	16	4	91	180	8/72	18	18	36	X
	MRX-50	*	16	4	104	250	8/72	8	12	20	X
Microdata Corp.	400 Series		8	1	3	4	1/70	135	0	135	X
	800 Series		8	1	6	11	5/69	2,055	1,380	3,435	X
	1600 Series		8	1	5	11	2/72	2,944	600	3,544	336
	3200 Series		16	1	8	14	3/74	20	0	20	43
	Micro-One		8	1	1	3	11/74	1	0	1	400
	Subtotal							3,175	1,980	7,155	
Mini Comp	Administrator-2		16	3	33	52	12/70	NA	0	NA	NA
	MD-708		8	1	5	7	8/70	50	0	50+	NA
	Multi User-II		16	3	67	85	11/70	NA	0	NA	NA
	Multi User-I		16	3	40	58	1/71	NA	0	NA	NA
Modular Computer Systems	Modcomp-I		16	1	7	9	10/71	550	0	550	100
	Modcomp-II		16	1	4	22	3/71	300	0	300	20
	Modcomp-III		16	2	13	44	12/70	100	0	100	20
	Modcomp-IV		16/32	3	19	89	5/74	50	0	50	50
	Subtotal							1,000	0	1,000	
Monroe	XI	*	32	2	21	28	5/60	250	200	450	X
Motorola Comm. Div.	MDP-1000		8	1	8	19	2/69	75	0	75+	X
	MC-6800		8	1	5			NA	0	NA	NA
Nanodata	QM-1		18	4	75	150	/73	NA	0	NA	NA
Nuclear Data, Inc.	ND-812		12	1	7	15	3/71	515	10	525	NA
Omnicomp Computer Corp.	Omnus-1		16	1	8	12	8/71	NA	0	NA	NA
Omnitec (BIT)	480		8	1	6	17	12/66	195	3	198	X
	483		8	2	9	33	1/70	115+	40	155+	NA
Philips	P-850 Series	*	16	1	3	13	4/71	155	NA	155+	NA
Prime	100		16	1	4	6	4/73	85	50	135	NA
	200		16	1	6	18	11/72	50	30	80	NA
	300		16	3	12	63	9/73	50	20	70	NA
Quntel Corp.	Quantel-V	*	8	2	14	30	6/70	75	0	75	NA
	Answer	*	8	2	12	27	5/72	110	0	110	NA
	S-1100	i	8	2	30	35	1/74	55	2	57	NA
	S-1200	i	8	2	34	42	1/74	75	12	87	10
	S-800	i	8	1	19	19	6/75	4	0	4	5
	S-900	i	8	2	25	32	6/75	4	2	6	10
Raytheon Data	703		16	1	13	23	10/66	179	33	212	X
	704		16	1	10	18	3/70	600	180	780	75
	706		16	2	19	30	5/69	75	17	92	X
	Fb-250		22	2	33	48	12/60	115	20	135	X
	Fb-440		24	4		140	3/64	20	2	22	X
	Fb-520		24	4		128	10/65	26	1	27	X
	RDS-500		16	1	8	14	12/73	NA	NA	NA	NA
	Subtotal							1,015	253	1,268	
Redcor Corp.	RC-70		16+2	2	15	30	7/68	125	15	140	X
Rolm Corp.	1601	j	16	2	13	28	3/70	980	120	1,100	NA
	1602	j	16	3	18	55	2/73	175	25	200	NA
	1603	j	16	2	13	25	10/74	15	5	20	NA
Sanders	Series-200		16+2	4	57	120	3/69	NA	NA	NA	X
	Series-800		16				12/71	NA	NA	NA	NA
	MIP-16		16	2	15	30		NA	NA	NA	NA
Spear	Microlinc		12	3	46	57	6/66	33	3	36	X
Spirae Systems/USM	65		16	2	19	40	8/69	25	2	27+	X
Systems Computer Corp.	500		8				6/72	NA	0	NA	NA
	1000		8	1	4		1/71	600	0	600	NA
	1500		8				6/72	NA	0	NA	NA
Sys. Engineering Labs.	810		16	2	38	45	9/65	24	6	30	X
	810-A		16	3	18	90	4/67	236	10	246	X
	810-B		18	4	30	150	12/68	168	10	178	X
	840		24	3	63	80	11/65	3	0	3	X
	840-A		24	3	60	75	8/66	36	4	40	X
	840-MF		24	4	40	240	12/67	33	0	33	X
	85		32	4	150	240	7/72	20	3	23	NA
	86		32	4	200	325	6/70	46	5	51	NA
	88		32	4	350	600	3/71	5	1	6	NA
	32		32	3	25	70	8/75	-	-	-	NA
	Subtotal							571	39	610	
Tenet	210		32	4	200	385	8/71	NA	0	NA	NA
Texas Instruments	960		16	2	14	30	6/70	400+	0	400+	X
	960-A		16	1	3		11/71	800	0	800	NA
	980		16	2	17	40	5/68	300+	0	300+	X
	980-A		16	1	4		5/72	200	0	200	NA
	Subtotal							1,700	0	1,700	
Unicom Inc.	CP-8A		8	1	3		2/70	135	20	155	NA
	CP-8B		8	1	3		3/70	90	15	105	NA
	CP-8C		8	1	5		3/70	165	30	195	NA
	CP-8D		8	1	7		4/70	30	5	35	NA
Unicomp Inc.	Comp-16		16	2	11	29	6/70	26	0	26	X
	Comp-18		18	2	12	38	8/70	38	0	38	X
Univac (EMR)	6130/6135		16+2	4	85	200	3/66	60	38	98	X
	6140/6145		16	4	60	120	6/72	NA	NA	NA	NA
	6020		24	4	72	175	4/63	13	3	16	X
	6040		24	4	98	225	7/65	9	1	10	X
	6050		24	4	123	360	2/66	17	6	23	X
	6070		24	4	240	600	10/63	1	3	4	X
Varian	520/i		16	1	6	13	9/68	350	150	500	X
	620/a		16	3		75	12/65	135	15	150	X
	620/f		17+1	1	11	25	6/70	210	40	250	X
	620/f-100		16	1	10	22	6/72	275	55	330	NA
	620/i		16+2	1	10	20	12/65	1,220	80	1,300	X
	620/L & 100c		16	1	5	12	3/71	700	200	900	NA
	620/L-100		16	1	6	14	6/72	600	160	760	NA
	R-620 * 622/i		16+2	2	15	29	6/69	180	20	200	X
	V-72				10		2/74	110	20	130	NA
	V-73						11/72	300	100	400	NA
	V-74			3	40		3/74	20	0	20	NA
	V-75							NA	NA	NA	NA
	Subtotal							4,100	840	4,940	
Variasystems	PAC-16	k	16	1	4		5/69	20	0	20+	X
Wang Labs	3330 Basic		8	2	14	40	4/71	80	0	80+	NA
	WCS/10		8	1	5.7	8.5	4/75	-	-	-	NA
	WCS/20		8	1	10	15	4/75	-	-	-	NA
	WCS/30		8	2	29.1	32	4/75	-	-	-	NA
Westinghouse	P-50		16	1	16	23	8/64	203	19	222	X
	P-250	l	16	3	40	62	9/67	38	10	48	X
	P-500 Series		18	4	83	110	6/63	39	6	45	X
	P-2000		16	2	10	27	8/69	157	44	201+	NA
	2500		16	2	10	30	11/71	133	20	153+	NA
	Subtotal							592	99	691	NA
Xerox	92		12	3		90	4/65	40	10	50	X
	910		24	4		120	8/62	170	10	180	X
	920		24	4		130	9/62	110	20	130	X
	923		24	4		200	12/64	10	4	14	X
	930		24	4	80	400	6/64	100	25	125	X
	CR-16 & A		16	1	8	23	6/69	40	3	43	X
	CF-16 & A	m	16	1	8	17	11/70	93	7	100	Neg.
	Sigma-2		16	4	24	125	12/66	210	40	250	X
	Sigma-3		16	4	28	140	1/70	223	85	310	NA
	Subtotal							998	206	1,204	
XLO	Eight		8	1	4		1/71	50+	0	50+	NA

* primarily sold as "small business computer" and/or "intelligent terminal/data entry"

a. cross-licensed version of Microdata-800
b. cross-licensed version of Interdata-1
c. cross-licensed version of Interdata-4
d. cross-licensed version of Interdata-70
e. utilizes 2115-A or B (Educ. Basic Systems)
f. excluding 2000 and 2007 "system" configurations avoid double counting
g. utilizes two H-316's
h. interactive graphics display systems (free standing or remote)
i. sold as stand-alone mini-based business system and as part of larger distributed processing network
j. software compatible with Data General/Nova
k. manufactured by Photon, Inc.
l. utilizes Xerox - Sigma 2
m. utilizes CAI-116

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AS OF JANUARY 1, 1975

NAME OF MANUFACTURER	COMPUTER MODEL	NOTES	BITS PER WORD	PRICE CLASS	PURCHASE PRICE ($1,000) BASIC	PURCHASE PRICE ($1,000) AVERAGE	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Datamate Computer Systems	DM-16		16	2	17	26	11/69	12	0	12	X
	DM-70		16	1	9	15	12/70	25+	0	25+	NA
	DM-70/ROM		16	1	4	6	10/70	NA	0	NA	NA
	ECP-18		18	1	14	16	11/66	21	0	21	X
	2400		24+3	1	15			NA	0	NA	NA
Data Technology	1600		8	1	6	22	9/68	NA	0	NA	NA
Digiac Corp.	3060			1	9	13	1/70	90	0	90	NA
	3080		25	1	20	25	12/64	16	0	16	X
	3080-C		25	1	26	37	10/67	8	2	10	X
	3090			1	5		2/74	10	0	10	NA
Digital Computer Controls	D-112		12	1	3	12	8/70	1,725	185	1,910	]
	D-116		16	1	3	12	2/72	2,980	345	3,325	] 3,125
Digital Equipment Corp.	PDP-1		18	4	120	136	11/60	35	6	41	X
	PDP-4		18	3		74	8/62	30	3	33	X
	PDP-5		12	2	30	36	9/63	61	29	90	X
	PDP-7		18	3		66	11/64	69	46	115	X
	PDP-8, i,l,s		12	2	8	27	5/65	5,765	3,685	9,450	X
	PDP-8/e,f,m		12	1	4	12	4/71	11,490	5,660	17,150	2,000
	PDP-8/Linc		12	2	38	48	9/66	88	46	134	X
	PDP-9 & 9L		18	2	35	50	12/66	290	160	450	X
	PDP-11-05 & 10		16	1	5/7	12	2/72	5,215	3,335	8,550	1,200
	PDP-15 & 20		16	1	3/11	16	3/70	2,760	1,490	4,250	300
	PDP-35 & 40		16	2	9/13	30	1/73	2,610	1,040	3,650	700
	PDP-45 & 50		16	3	24/32	80	4/72	1,210	440	1,650	350
	PDP-12		12	2	13	45	4/69	500	250	750	Neg.
	PDP-15		18	3	15	75	2/70	430	240	700	50
	PDP-8/A						10/74	NA	NA	NA	NA
	PDP-11/70						7/75	NA	NA	NA	NA
	LSI-11						6/75	NA	NA	NA	NA
	Subtotal							30,583	16,430	47,013	
Digital Scientific Corp.	Meta-4		16	3	29	90	4/70	100	5	105	7
Dynamic Research	DPC-44		24	2		36	7/68	NA	0	NA	NA
Eldorado	140/200	*	8	2	18	30	1/70	390	0	390	25
Electronic Associates Inc.	640		16	3	27	55	6/67	110	61	171	X
	1020		16	1	20	25	2/64	100	25	125	X
	8400		32	4	200	450	6/65	21	8	29	X
	Pacer-100		16	2	15	40	5/72	110	90	200	35
Electronic Processors Inc.	EPI-118		18	1	3	14	11/70	NA	0	NA	NA
	EPI-218		18	1	4	16	1/72	NA	0	NA	NA
EMR	210		12	4	94	132	4/62	9	0	9	X
	420		42	4	324	450	6/63	3	0	3	X
	2100		21	4	65	143	12/63	8	0	8	X
Foto-Mem, Inc.	Centaur-100		8	1	6	20	4/70	25	0	25	NA
Four-Phase Systems	IV/40		24	3	16	55	6/73	300	0	300	100
	IV/70	*	24	3	16	60	3/71	650	0	650	100
Foxboro	Fox-1		24	4	95	260	10/72	NA	NA	NA	NA
	2/10		16	2	30	50	11/72	NA	NA	NA	NA
	2/20		16	3	50	100	9/73	NA	NA	NA	NA
General Automation Inc.	GA-18/30		16	2	18	50	7/68	550	110	660	Neg.
	SPC-12		8	1	4	16	1/68	3,025	725	3,750	100
	SPC-16		16	1	8	25	5/70	3,550	500	4,050	500
GE/PAC	30	b	8	1	7	35	5/69	225	50	275	NA
	312		20	4		200	3/60	27	6	33	X
	412		20	4		300	7/62	39	8	47	X
	3010	c	16	3	13	90	5/70	25	1	26	X
	3010/2	d	16	4	13	140	12/71	NA	NA	NA	NA
	4010		24	4	76	200	10/70	33	5	38	NA
	4020		24	4	79	250	2/67	200	60	260	X
	4040		24	4		120	8/64	45	20	65	X
	4050		24	4		280	12/66	23	3	26	X
	4080		24	4		340	6/65	18	6	24	X
	4070		24	4	300	1,000		NA	NA	NA	NA
	4401		24	4		235	9/74	NA	NA	NA	NA
	4402		24	4		500		NA	NA	NA	NA
	Subtotal							635	159	794	
GRI Computer	909 Series		16	1	4	9	1/70	365	75	440	50
	99/30		16	1	3	15	8/72	400	65	465	100
	99/40		16	1	6	17	6/72	120	20	140	25
GTAE (Tempo)	I		16	2	14	36	1/70	100	20	120	NA
	II		16	1	6	10	6/72	60	0	60	NA
	IS-7000		16	1	8	13	6/72	NA	NA	NA	NA
Hewlett-Packard	2107-A	*	16	2	20	40	9/68	10	10	20	X
	2100-A		16	1	7	15	6/71	5,415	2,125	7,540	900
	2100-S		16	2	16	35	8/73	500	270	770	470
	2114-A		16	1	10	16	5/68	305	310	615	X
	2114-B		16	1	9	15	10/68	530	185	715	X
	2115-A		16	2	15	26	11/67	240	100	340	X
	2116-A		16	2	22	32	11/66	265	200	465	X
	2116-B		16	2	24	40	8/68	450	255	705	X
	2116-C		16	2	20	45	11/69	505	95	600	X
	21-MX							350	150	500	100
	3000		16	4	100	185	11/72	80	20	100	30
	Subtotal	f						8,850	3,720	12,570	
Honeywell	19		19	4		140	5/61	3	0	3	X
	21		20	3		63	2/66	41	25	66	X
	24		24	4		200	5/63	82	3	85	X
	112		12	1	3	10	11/69	222	48	270	X
	116		16	3		65	4/68	172	35	207	X
	124		24	4	65	130	3/66	109	18	127	X
	224		24	4	75	380	3/65	55	8	63	X
	290		18	4		175	11/60	10	1	11	X
	316		16	2	8	45	6/69	1,450	565	2,015	X
	324		24	4	175	250	7/68	12	0	12	X
	416		16	2	17	43	4/67	198	130	328	X
	516		16	3	24	95	10/66	865	285	1,150	X
	632		32	4	97	450	12/68	10	4	14	X
	700 Series		16	3	16	53	6/72	1,490	465	1,955	400
	164X Series	g	16	4	144	440	12/69	20	8	28	X
	Subtotal							4,739	1,596	6,335	
IBM	1710/1720		6	4		225	2/62	8	10	18	X
	1800		16+2	4	47	235	2/66	550	380	930	X
	System/7		16	3	17	80	11/71	3,855	1,145	5,000	1,000
Ialac	706-1	h	16	1	10	11	2/70	NA	NA	NA	NA
	706-4	h	16	1	17	21	12/73	NA	NA	NA	NA

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Information Technology Inc.	4900/5		8	1	3	5	10/70	NA	0	NA	NA
	4900/10		16	1	10	20	10/65	25	0	25	X
	4900/20		12/32	2	30	50	10/69	20+	0	20+	X
Infotronics	Mini/Maxi		16	1		25	7/70	NA	0	NA	NA
Interdata	1		8	1	4	11	9/70	235	85	320	X
	2		16	1	11	14	7/68	20	0	20	X
	3		16	1	13	20	5/67	200	5	205	X
	4		16	1	9	21	8/68	300	125	425	X
	5		16	1	11	25	11/70	80	20	100	X
	15		16	2	22	35	9/69	40	24	64	X
	16/18		16	2	15	30	8/71	3	13	16	X
	50		16+1	1	7	19	4/72	90	25	115	20
	55		16+1	2	16	40	8/72	75	20	95	20
	70		16	3	9	65	12/71	750	205	955	150
	74		16	2	3	34	2/73	200	52	252	65
	80		16	2	15	44	7/72	50	15	65	15
	85		16	3	23	60	7/73	25	6	31	15
	7/16		16	2	3	35	2/74	170	50	220	150
	7/32		16	3	10	73	7/74	50	20	70	50
	8/32							NA	NA	NA	NA
	Subtotal							2,288	665	2,953	
Interplex	System-1		16	2		47	9/70	NA	0	NA	NA
Kenne Associates Inc.	System/4			3		65	11/71	150	0	150+	NA
Linolex	Model A	*	8	2	10	30	8/72	75	0	75+	NA

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• SPRUCING UP ITS MATURE 3000 LINE OF COMPUTERS, Control Data Corporation has announced new peripherals: disk, tape, and memory. For use with the CDC 3170, 3300 or 3500 computers, the new units should add some fizz to CDC's medium-scale business computer line begun a decade ago with the CDC 3300 and its predecessor, the 3200, now out of production. First is a new disk controller, the CDC 3554-1, which comes with its own small, programmable processor and can handle up to eight disk drives -- for triple the storage previously available for the 3170 and 3300. On all of the systems, data transfer is three times faster now. Purchase price for a disk controller -- to be available before Christmas -- is $94.5K; for a disk drive it's $29.4K.

The new magnetic tape controllers (2) offer two new features . . . in 200 ips transport speed and 33% improvement in data transfer rate. Each controller contains a subsystem processor, 4K word memory system, and a channel coupler. The subsystem processor uses what CDC calls "controlware" to talk up to the higher level processor and down to the internal tape control units. A single CDC 3521 tape controller costs $29K, a dual model slightly more than twice that. Both 9- and 7-track tapes can be accommodated.

The memory add-on system, the CDC 3373, incorporates core memory planes and IC logic to cut space, power, and cooling requirements by 85%, according to the company. A basic system starts at 16K 24-bit words ($91K) and works its way up to 131K words in 16K increments ($16K each). A computer can have up to two memory systems attached . . . and a memory system can be accessed by two CPUs and two communications multiplexors with the addition of optional access channels.

With all this going on -- and CYBER 170 shipments to begin next month -- William Norris, chairman of CDC, painted a fairly optimistic picture for CDC stockholders at their annual meeting this month, saying his company "is in an increasingly better position to contend with future uncertainties in world economic conditions." He did, however, reiterate predictions that CDC's return to profitability in the computer business would be gradual.

• IN A PRE-EFTS MOVE TO NAB SEVERAL BIRDS WITH THE SAME STONE, TRW has announced a check cashing control system for supermarket chains. The stone in this case is the TRW 4005 processor (see page 4). It and its 32K word memory are housed at the chain headquarters -- along with a disk and tape unit for mass storage -- and operates on-line to the branch stores. There, terminals at the points of sale can make inquiries and updates on the master file.

The system works by exception, meaning that all checks are okayed unless the customer has had a bad one before (initial file load is from a negative list of bad risks). A customer's first check creates his or her file. At the store level, predetermined time intervals between checks can be set and -- to the possible chagrin of privacy buffs -- vary from customer to customer. By weeding out such bad apples, says TRW, store losses can be drastically reduced. "If all supermarket bad checks could be eliminated," TRW notes, "it is estimated that the industry could increase its net earnings by 10%.

• HOPING TO TAKE CARE OF EFTS BUSINESS BOTH ENDS AGAINST THE MIDDLE, Bunker Ramo and Compata, Inc., have signed an agreement to pool their abilities in transaction data processing for banks . . . Bunker with the terminals, Compata with the central computer site software. United we stand, divided we . . . .

• BAD BLOOD AT BLACK ROCK? Lawyer squabbles and behind-the-scenes misconduct allegations are "serious" says the judge in the IBM trial. So . . . July hearings.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JUNE 19, 1975 • VOL.10,NO.19 P.J.McGOVERN,PUBLISHER

INFOREX, ENTREX ANNOUNCE HIGH-END KEY-TO-DISKS; USERS FACE DATA ENTRY DILEMMA AS PROCESSING POWER MOVES OUTWARD

"Let Joe do it" has been an American work ethic since long before the advent of the computer . . . and recent product announcements by two of the leading key-to-disk manufacturers demonstrate a data entry trend toward letting "Joe" do even more of it . . . as processing power migrates closer to the data source and data keying tasks spread outward toward user (Joe's) departments.

The rationale for getting "Joe" to perform the data entry, of course, is fewer and faster keystrokes -- through source validation and editing -- and, when communicating directly with a mainframe, lower line costs.

But there are plenty of ways to skin the data entry cat, for according to International Data Corporation, publisher of EDP/IR, by 1979 the U.S. alone will sport over 1,500,000 data entry/data communications devices. Only a seventh of these will be keypunches, and less than a twentieth will be traditional key-to-disks. So for users, while the new Entrex and Inforex offerings promise new data entry avenues and more efficient mainframe use, they also serve to highlight the whole on-going data entry dilemma . . . intelligent terminals vs. shared processors, computer room control vs. distributed departmental control, and, to some extent, even IBM vs. the independents.

For the manufacturers, the new products and their equivalents from competitors like CMC, Mohawk, and Four-Phase -- laden with intelligence and communications -- represent perhaps a last bulwark against the certain waning of the market for traditional key-to-disks . . . and a chance to be in place when users shop for the one million devices -- almost $8 billion worth -- that IDC forecasters predict will be shipped between now and five years hence.

No wonder that to users and manufacturers alike the melange of data entry devices available now and yet to come -- as well as the conflicting concepts they embody -- causes confusion.

The new key-to-disk systems themselves come with all the extensive preprocessing capabilities one would expect to find in "new generation" equipment -- operator prompting, automatic data insertion, file formatting tools, foreground/

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background operation, and easy user programming. Typically, they both also have good-size minicomputers for processors and come with a variety of peripherals and disk sizes. The systems are:

- The Entrex 580 -- which comes with a bigger disk (29 MB) and keystation capacity (32) than its Entrex 480 predecessor . . . and new operating software to utilize the disk efficiently and support the validating files. User programmability is via Entrex COBOL. Rental price on a 3-year lease for a 20-station system with the big disk is $4178/month.

- The Inforex 3300 -- which overlays new software on Inforex 5000 hardware (EDP/IR, Sept.11,1974) with smaller disk (10 MB) and keystation capacity (16). The 3300 provides a combination of turnkey operation and user programmability through the use of "parametric programming" . . . and a 10 station system with 9-track tape drive on a 5-year lease costs just over $2000 a month.

Significantly, both systems also have communications options . . . bisynchronous now and, according to the companies, SDLC later. Indeed, their ultimate success may depend on these options.

Inforex spokesmen, for example, say that while only about 10% of the company's key-to-disk systems in the field today make use of the communications option "we see communications as the key to the future, the definite way to go." And Entrex, too, speaks of source data capture and mainframe communication as future reality when it plugs its product. In fact, the latest products from each of the major key-to-disk makers leave little doubt that communications is a crucial characteristic of new generation equipment.

Red ink blues

For the key-to-disk suppliers, new products like the 580 and the 3300 also mean not only a chance at market share, but more importantly, a hope for profitability in a sector of the computer industry which has proved perennially lean.

When IDC's Corporate Planning Service dug into the profit and revenue figures for 44 of the major independent peripheral companies in conjunction with a current report "Keys to Peripheral Profitability" the independent key-to-disk companies didn't fare too well. CMC and Mohawk -- accounting for almost a third of the total key-to-disk market -- both registered losses for 1974 . . . and Entrex and Inforex -- more than another third of the market -- broke only slightly more than even. Revenues, meanwhile, continue to climb faster than the computer industry average at an annual rate over 20%.

In contrast, recession-heavy 1974 seemed to be a good year for intelligent terminal makers. Sycor, Datapoint and smaller Cogar -- with almost $85 million in revenues last year, or two-thirds of the intelligent terminal market -- managed to rack up $6.6 million in profits (after taxes, and before extraordinary items). And 1975 looks just as good.

The key-to-disk manufacturer's profit problems seem to be threefold:

+ Like most of the computer industry, the business is capital-intense. Companies have traditionally had to bootstrap revenues with sales to third-party leasing companies . . . which unfortunately denies them

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the security of a customer rental base and subjects them to the high cost of money during the second round of capital investment. Entrex and CMC have already stated publicly that they are working to increase their rental base by cutting down sales to third party lessors, and others are sure to follow. There may also be a point in company growth -- what Inforex calls the "Forty Million Dollar Threshold" -- when a company gets too big to sustain exponential growth yet is still too small to have enough market clout to generate sufficient capital (or borrow it at the right price) to feed development and production.

+ The nature of the customer is changing. Where once key-to-disks were sold mainly as keypunch replacements, now they are going in as upgrades replacements for terminals or other key-to-disks. The technology ride is over . . . new systems must compete with their peers with sophistication and software -- expensive to develop, elusive to sell. In turn, trickier support and service -- over a widening, more geographically spread customer base -- is required.

+ IBM shunned the concept for many years . . . until the 3740 key-to-floppy disk. And without the Giant's blessing, independent manufacturers are forced to do heavy user-educating in order to place their products . . . in this case selling the concept of distributed processing in general, key-to-disk in particular.

While these are ailments common in varying degrees throughout the independent peripherals industry, for key-to-diskers they seem a little more intense . . . and whether that "Forty Million Dollar Threshold" represents business growth along a mathematically diverging series -- the more things continue, the worse they get -- or just the dues that must be paid now for later success is yet to tell. Balance sheet deficits may just be growing pains.

The big picture

IDC estimates that at yearend 1974 there were 820,000 keyboards in use in the U.S., a quarter of which were made by independent peripherals manufacturers. A breakdown of market share and 1974 revenues by product is shown on page 4.

By 1979 it is estimated that there will be twice as many keyboards installed domestically . . . and the independents will have boosted their share to over 35%. For the most part, this increase will be at the expense of IBM as the ubiquitous keypunch slowly devolves. The rapid growth of independent keyboards will be spurred by that in the categories of intelligent terminals and "distributed keyboard devices." The latter is a catch-all category into which the IBM 3790 and new generation key-to-disks are most likely to fall, depending on user applications. Growth in the various product sectors of the keyboard market is shown on page 5.

Within key-to-disks *per se*, Inforex currently leads the pack in number of devices installed on the basis of its successful 130X Series. Computer Machinery Corporation (CMC) is second only by a few thousand systems . . . and together, they account for about half of all key-to-disks in use at yearend 1974. Counting only the key-to-disk usage of its versatile System IV-70 and System IV-40, Four-Phase ranks third in market share with only a tenth of the market. Entrex and Honeywell come after that, followed by a spate of suppliers such as Mohawk, GTE/IS, General Computer and others. As with Four-Phase, Mohawk's market share is based only on data entry usage of its Systems 1200 and 2400.

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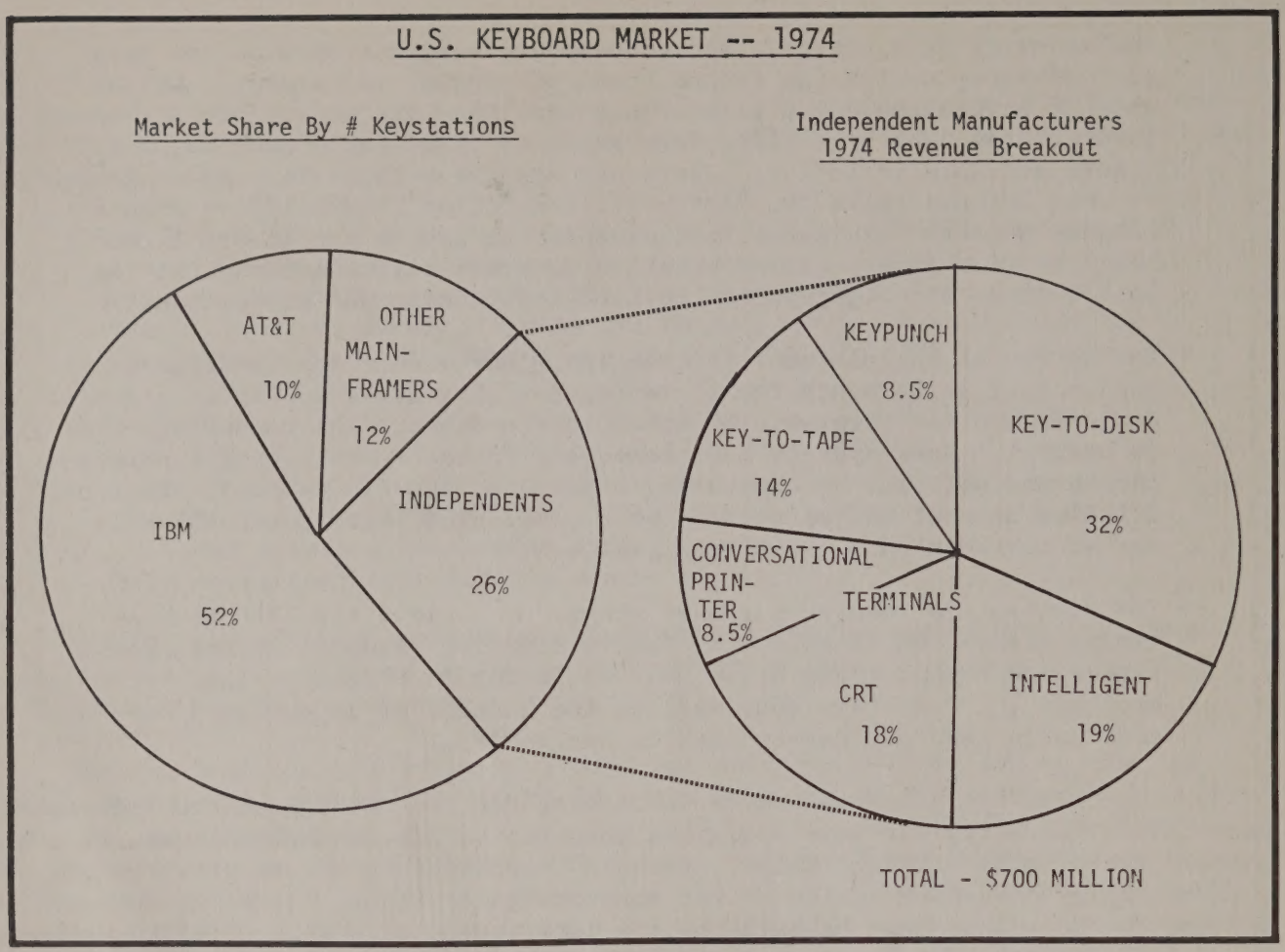

Distributed keyboard whatsis?

Far and away the most explosive growth to come within the keyboard universe is destined to be that for distributed keyboard devices . . . and products are trekking to the category from all directions. But what exactly is the critter?

Basically it's an operator-oriented remote batch terminal with a disk or diskette for local storage, a mini or microcomputer for local processing, and telecommunications link to a central computer. At the data entry end, applications and control software give the device -- system might be a better word -- overtones of distributed data base management and/or possible autotransaction applications through the use of source data capture. When used in certain configurations, distributed keyboard devices might include the following examples, as well as others yet unannounced:

+ IBM 3790 Communications System (shared processor, programmable only from the central computer)

+ Entrex 580, Inforex 3300, or other key-to-disk systems utilizing communications and doing some local processing

+ Data 100's Keybatch, a remote batch terminal turned operator-oriented with cartridge disk and appropriate software

+ Intelligent terminals, clustered and used in a remote batch manner

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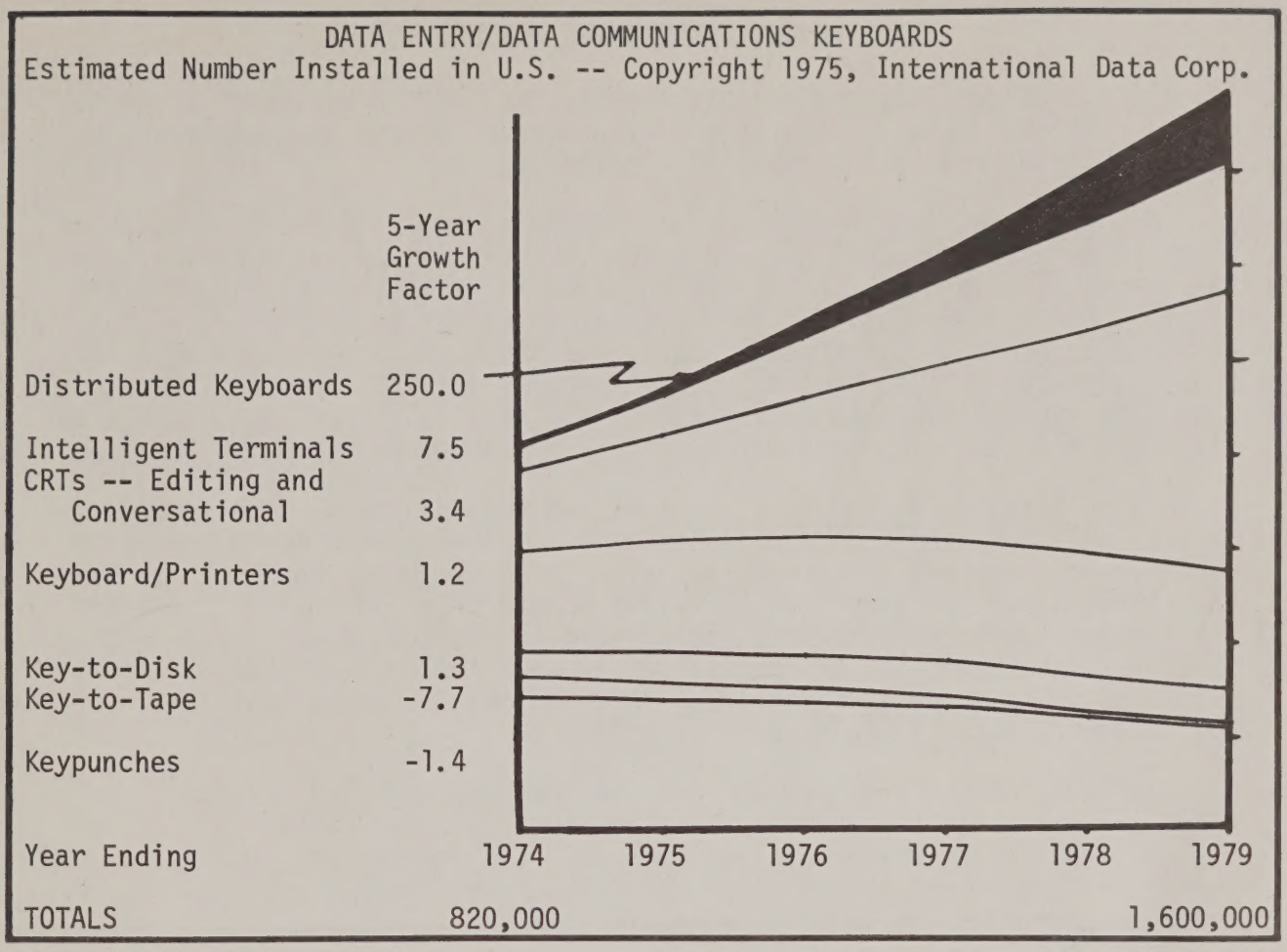

The IBM sanction

The long-delayed reaction of IBM to the changing tides within the data entry peripherals business is the 3790 Communication System -- first of the company's peripherals to utilize the mysterious SDLC communications protocol. And while it accepts the concept of shared-processor, distributed data entry, it seems to do so grudgingly . . . with full decentralized control lacking since source programs are compiled on the host IBM VS 370 computer.

Basically the 3790 is a keystation/peripherals controller -- with hardware surprisingly identical to the IBM System/32 small business computer (microcode makes the difference . . .) -- and, in fact, may be the prototype distributed keyboard system. With up to 48K bytes of control storage, removable floppies, and up to 26.9M bytes of fixed disk storage it brings considerable processing power into the foreground. Off the 3790 may be hung up to 16 IBM 3270 display stations, up to 4 IBM 3793 keyboard-printer stations, and other I/O peripherals.

And although user acceptance of the 3790 has been termed "underwhelming" (from an IDC study of user plans as of late 1974) . . . the system is still viable enough to make key-to-disk manufacturers, intelligent terminal builders, and even some mini makers both thankful for the IBM seal of approval on distributive processing . . . and wary of the Giant's attention. In this case, though, the independents may have the upper hand. For one thing, they were there first and for another they may not be directly competitive . . . potential users have looked at the 3790 as replacement for whole computers, especially the System/32.

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THE MOVING FINGER, THE HORSE'S MOUTH

For the source data-capture epicure looking for ways to bypass the conventional keyboard route -- say, when hunt-and-peck is just too removed, too blah -- EDP/IR notes these maverick alternatives:

McDonnell Douglas' Mavis -- a data exchange system debuted at NCC last month which uses the touch-tone telephone for data entry and a simulated human voice for response. The system -- which can also include the more traditional CRT key-to-disk, IBM 3270 simulation and batch processing -- can accommodate up to 256 telephone lines. And though some may consider a call from a computer with a simulated human voice as slightly obscene . . . the potential applications and equipment savings have to be admitted. One question though is this: can you wiretap it? . . . and would you want to?

Talos Systems' Alpha/Tablet -- a method for inputting alphanumerics into a computing system with a ball-point pen and preprinted forms, pads, or overlays on a special electronic tablet. To accommodate specific user needs, the "recognition software" can be melded with custom applications software. The company's previous products include similar devices with an engineering bent, but who knows, as autotransaction expands the human/computer interface such a commercial oddity might catch on -- except in the medical field, of course, where doctors wield the ball-points.

In fact, as the computer follows the telephone into our culture, concepts such as Mavis and the Alpha/Tablet may grow more viable . . . after all they substitute fixed-cost equipment for all the bodies between the computer and "Joe." And in the long run that swap may save a lotta bucks.

Moving on

As local data storage, increased local processing power, and more coatings of software at the user end accompany the growth of distributed keyboard data entry, one far-off possibility begins to take a more discernable shape . . . the marriage of data entry and word processing.

Both the Entrex 580 and the Inforex 3300 systems come with at least some budding word processing capability -- edit and keyover functions for example -- and both stress the ease of use by non-DP personnel. As an Entrex officer pointed out at 580 press announcement, his company uses COBOL for user programming "only because it is the most popular high level language." The Inforex system (like the Inforex 5000) is allegedly built even more for humans.

The ultimate data entry language would, after all, be the King's English.

But for now, the independent data entry outfits have some much more down-to-earth concerns:

- Can they indeed sustain the business growth needed to develop and manufacture the "new generation" equipment necessary to stay in the race . . . competing in a multi-industry field?

- Is their vision right? Or will they see a market base eroded by new equipment and concepts . . . such as industry-specific autotransaction systems, minicomputer networks, and the like?

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Ten year, $10 million bandwagon

CDC ANNOUNCES SEQUEL TO IBM'S 3850; GOES FOR 370 USERS

Among the sights and sounds on the NCC exhibit floor last month, one of the real crowd gatherers was at the Control Data booth . . . and the everpresent onlookers weren't there merely to rubberneck a magic show or ogle the L.A. models.

Instead, the attraction was the CDC 38500 Mass Storage System -- up and running -- targeted for the heart of IBM's 3850 business, the large 370 user -- VS or otherwise. According to CDC, its rendition of "Oak" was ten years and $10 million in the making and is the most significant peripheral CDC has ever announced, "the biggest move forward in storage since the introduction of disks."

Similar in nature to the IBM system, the CDC 38500 features:

- 8-Megabyte data cartridges that hold a magnetic tape about 12 feet long and 3 inches wide for random access data storage. An eight-pack of cartridges will cost about $120.

- A storage facility that can house 2000 data cartridges and from two to four read/write stations. Cartridges are plucked from the housing and moved to the fixed stations, and cartridge access is facilitated by a cueing system. Advertised access time is 5 seconds.

- A disk storage subsystem -- which can be the user's current disk system with no additional controllers -- for staging of data. Specific disks need not be allocated for staging, and certain operations of the 38500 utilize a direct tape-to-computer data transfer.

- Virtual Data Set Access Method (VDAM) software that allows the 38500 to be used with all the operating systems currently in use on IBM 370/145s and up . . . and with up to four computers at once. Later software will allow for 38500 use with CDC and other computers.

- A pricetag of $326,335 for a basic system with one file unit, two read/write stations and adapters. Lease price (3-year) for the same system will be $9340 including software. Maintenance, priced separately, is $987 a month. Individual file units, read/write stations, mass storage adapters and control units can be added depending on user needs.

Optimum data set?

CDC claims its 8 MB data cartridge offers an optimum tradeoff between unit size and ease of access. According to the company, 70% of all data sets contain less than 2 MB of data, 90% less than 16 MB. Ergo, argues the company, the smaller cartridge should be quite sufficient for most needs -- with a payoff in faster access time than the IBM 50MB cartridges (with claimed access time of 16 sec.) allow. CDC also touts the ability to transfer data directly from the tape facility to the computer . . . meaning more savings for the user.

Volume shipments of the 38500 are expected in fourth quarter 1976, and at least two are installed at test sites now (including Honeywell, recent partner in Magnetic Peripherals, Inc., with CDC). But whether those shipments can match IBM's (IDC expects over 1,000 units to be shipped by 1980) remains to be seen.

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• THAT CII-HONEYWELL BULL LIAISON MOVED CLOSER TO REALITY recently with an agreement in principle between the two mainframers to consummate a merger that will leave the American company holding 47% of the new firm and French interests the remainder. In return for accepting a minority position in the new firm (CII-HB) Honeywell will receive approximately $60 million. In addition, Honeywell should enjoy freer access to nationalistic French markets, close ties with CII shareholder and electrical and electronic goods manufacturer Compagnie Generale d'Electricite, and hundreds of millions of dollars worth of French government support during a four year transition period for the new CII-HB.

Long range keystone of the new company's product line will be the Honeywell Series 60 computer, but the CII product line -- including the Unidata 7740 -- will also be offered. Frenchman Jean-Pierre Brule, former president of Honeywell Bull, will head up the new firm and captain a workforce over 20,000. That slice of CII not concerned with business computers -- military and small computer products and peripherals -- will regroup later under the aegis of Thompson-CSF, CII's major stockholder.

The merger, representing Honeywell's hope for revitalization of its European business, has met some resistance in the French sector . . . including proponents of French industry nationalization, boosters of the Unidata consortium, and CII president, Michael Barre, who resigned in protest. But whether the controversy can prevent closing of the deal -- which Honeywell expects in the fall -- remains to be seen.

• TOPPING OFF ITS L SERIES OF ACCOUNTING MACHINE/COMPUTERS, Burroughs has added a new 60 cps bidirectional matrix printer to the L 8000 and turned it into the new L 9000. Peripherals, software, communications, and other I/O options remain the same, but the company claims the L 9000 can "double the throughput of the current L Series." Prices for basic systems (not counting peripherals) in the three-model line run from $17K to $27K, monthly lease prices from $577 to $862. With prices like that the accounting machines (computers? minis?) are well placed to protect Burroughs' flanks from System/32 competition (EDP/IR, Feb.12, 1975).

• WHILE IBM COOLS ITS HEELS AWAITING NATO OK OF ITS RUSSIA TRADE, UNIVAC has gotten the U.S. Department of Commerce nod for a $10 million sale -- an 1106-II -- to the Soviet state airline, Aeroflot. The computer will anchor the airline's reservations system, with software provided by Air France, another Univac customer. Univac's export license means it has the NATO subcommittee approval that's currently stalling IBM's own $10 million deal (EDP/IR, April 30,1975) . . . but Univac says some "further plans" are yet to come before actual shipment.

• THERE'S A NEW PLACE TO PARK YOUR WINCHESTER: THE IBM SYSTEM/7. Latest of the System/7 enhancements that began last fall with IBM 370 hook-up capability and proceeded through the winter with new peripheral options and software, the 3340 attachment should give users new ways to use the IBM mini . . . and IBM a new market for its disks. A System/7 with 3340 in minimum configuration can be rented for $4220 or bought for $148K. First customer shipments are scheduled for next May.

• PETITION OF WRIT IN HAND, TELEX CORPORATION HAS APPROACHED THE HIGH COURT in its last shot at reversal of the appellate court decision exonerating IBM of monopoly. Speculation has the Supreme Court acting sometime this fall.

• IF YOU DIDN'T GET YOUR MAGNIFYING GLASS WITH OUR "MINI" MINICOMPUTER CENSUS of last issue, just contact us and we'll send you a more readable printout. Sorry.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JUNE 27, 1975 • VOL.10,NO.20 P.J.McGOVERN,PUBLISHER

AS "THE" TRIAL BEGINS, IBM'S ATTENTION TURNS TO COMMUNICATIONS; INDUSTRY OUTLOOK HEARTENING AFTER SUCCESSFUL NATIONAL COMPUTER CONFERENCE

In more than a casual way, the events of recent weeks amplify the watershed nature of the times (EDP/IR Apr.30,1975) . . . underscoring the new phase now beginning in the history of the computer industry. The timing of the following developments may be purely circumstantial on IBM's part, but they can be fit logically into a developing scenario for the computer industry:

- U.S. vs. IBM -- the largest antitrust case in history -- got underway on May 19 as expected. Action to date has been preliminary, with the government interspersing readings from prior IBM depositions with testimony from economists, then others. IBM's cursory motion for dismissal was denied, and a slow, two-plus-year period of legal maneuvering has begun. Already the judge has been trying to speed proceedings.

- Ten days later, IBM announced it had realigned its product development activities to "strengthen the company's focus on the growing importance of communications products."

- About mid-June, IBM and the Comsat General Corp. asked the Federal Communications Commission to accept the "balanced CML" option held out in February when an initial application to buy out Lockheed and MCI interests in a domestic satellite was denied. Plans proposed by IBM and CGC call for a domestic communications satellite service in which IBM would participate but not hold a majority interest.

- This week, IBM's General Systems Division introduced a nine-part Industry Application Program for manufacturing and enhanced the System/32 so that it can act like a 3770 or a System/3 in a communications network.

So the stage seemed once again set . . . and the parallel with 20 years ago is astounding. Today, IBM is arguing that it has not violated antitrust laws insofar as the data processing industry is concerned . . . while a highly visible portion of its business thrust is in staking out a claim in the up-and-coming data communications marketplace. Then, a much smaller IBM was "consenting" about the tabulating machine market . . . as IBM struggled with early entries in the computer race.

And as this round began, the economy has perked. That, at least, is the overwhelming vote of exhibitors at the National Computer Conference last month.

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The recession is over, but . . .

At and during NCC in Anaheim, EDP/IR set out to measure the pulse of the industry participants represented among the exhibitors. Subsequently, additional industry representatives have been contacted to fill out a few gaps in the sample. Two major conclusions -- as Midyear 1975 approaches -- are:

- To a man, survey participants voted the 1975 National Computer Conference a heartening success. What's more, hopes for 1976, back in Bicentennial New York, already are being raised.

- The economy has turned around. This conclusion, although cautious on some parts, is more than theory or echos of their own optimism -- the respondents talk about better attitudes on the part of potential customers plus more orders and increased backlogs.

And this marks a change, since during the past year virtually everyone has been affected -- if not directly in their own operations, then through the worried looks of suppliers and customers. The most common reaction to the recession has been to postpone orders . . . even to cancel business in a few cases. Some customers had trouble obtaining financing, so one of the big question marks still sitting out front is whether or not the financing of heavy government deficits will cause this to happen again and dampen a 1975-76 recovery.

Looking back at the recession, everyone felt it, especially suppliers to the auto industry. On the other hand, vendors report that aerospace and government sectors seemed to hold up quite well, especially as compared to the last one. And across the board, as would be expected, plug compatible manufacturers reported better reception by customers. Geographically, Europe has been strong, with even the United Kingdom holding up better than its lagging economy would have indicated. The Japanese market, however, reflected a real set of the blues.

The Show's attendance -- some 34,000 -- was as high or higher than expected. Attendees were optimistic (perhaps these types were the only ones who opted to attend) and there seemed to be more decision-makers. In general, the Show reaffirmed the growing sentiment that "Inflation is over, the recession is ended." Exhibitors cautioned, however, that some of their rejuvenated business volume could be inventory replenishment. Other trend-like ideas around the Convention Center:

- There is user interest, in general, in high-speed printers (EDP/IR May 12, 1975) and output. Comments around the Canon booth were favorable . . . the Xerox 1200 always drew a crowd, as did the Calcomp plotter and the Kodak show on COM.

- There is interest (well beyond the realms of such as Prime, Hewlett-Packard, and General Automation) in big minis and their application to general-purpose jobs. At many sessions, the "message" continued to stress that computers are getting smaller and cheaper.

- The "rub" still is software, the pits of computing. As Neil Gorchow of Univac, a luncheon speaker, said: ". . . this year we have a lot of sessions on software. Last year we had a lot of sessions on software . . ." Message: You just can't get the human brain to improve as fast as is possible with chips of silicon. And the final solution probably will be to include most brainwork in the hardware.

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A critical Cronin comment

COMPUTER INDUSTRY INFECTED -- BUT PROGNOSIS IS MORE THAN SATISFACTORY

At a press breakfast scheduled during the National Computer Conference to announce his company's new 3300 (EDP/IR June 19,1975), T.C. Cronin, chief executive officer of Inforex, directed most of his remarks to a description of the industry -- as it looks from his vantage point. He concluded his remarks with some comments about his company -- but left the product hoopla to his lieutenants.

While EDP/IR doesn't completely endorse everything Cronin said, we think it is a valuable perspective on the times . . . worth reporting in some detail. The following excerpts from his speech are presented with some editing, but organizationally and substantively as delivered last month.

As a veteran of 15 years . . . I've had an opportunity to observe the information systems industry from a variety of perspectives. In all that time -- through the slump of the 1969-70 period, and through the vibrant growth periods that preceded and followed it -- I can't ever remember the industry in a period of more uncertainty than exists today. The forces at work in the industry today are more subtle, and more unsettling, than this industry has witnessed before. They are forces that attack the spirit of those involved, and they reach to the highest places in our judicial system, financial system, productive system, and consumer system.

Key words to describe the net impact of these forces might range from "caution" to "disillusion;" or from "wary" to "shell-shocked;" or from "disappointment" to "disgust." . . . I am sure each of us has experienced this sense of malaise that has attached the industry like a viral infection . . .

What is most disturbing to me, as chief executive of one of the youngest and more successful companies in the information systems business, is the fact that this virus has attacked attitudes more effectively than it has attacked -- or undermined -- the actual realities of this massive market. To the extent that attitudes govern involvement, however, there has been a profound, and for the most part negative, dislocation in the credibility of the information systems business and those who compete in it.

This pervasive fear, or uncertainty, disturbs me for several reasons. First, because like a virus, the ailments of the industry are transient; they will go away. Second, because people are judging the severity of the illness by what seems to be its obvious symptoms, and not looking at the underlying health of the infected organism. And third, because the medication being prescribed, or dispensed, may very well be based on the wrong diagnosis.

* * * * * * *

[Here are] my own views on the state of health of the information systems business -- first, the primary factors that impact the industry today . . . then some of the major reasons why I think the information systems industry is one of the most fundamentally sound, long-term businesses in the history of our industrial development. As far as I am concerned, the good far outweighs the bad.

Of many factors that govern attitudes about the information systems business today, let's examine four principal contributors to the current perspective: The immunity illusion; The behavioral bottleneck; The glamour glut; The legal landslide. Together, they have wreaked devastation on the business.

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THE IMMUNITY ILLUSION -- one of those unseen, unspoken forces that helped establish a level of expectation about computer-related products that was simply unjustified . . . information systems were recession-proof because office productivity in a down economy would assure continuing sales of information systems. A lot of people -- inside and outside the industry -- believed it. And the fact that many computer-type companies, like Inforex, actually boomed during the 1969-70 period, tended to reinforce the myth.

But this time, it has become clear that the industry isn't immune to recession. The negatives that affect all industry sectors affect us too. Capital expenditure deferrals . . . customers unable to pay bills promptly, or at all . . . slowdown in order rates . . . price-cutting by marginal suppliers . . . contraction of money availability -- equity or debt.

These are the realities the information systems business has experienced this time around . . . and they are reasonable experiences. But the immunity illusion did exist, and the perception of an industry buffered from economic realities was operative, and along with the recession came a bursting of that illusion. The expectation was too high. The reaction was too great.

THE GLAMOUR GLUT -- in close parallel to immunity. Investors in the mid-Sixties rushed to cash in on the "high growth/high glamour" image of computer-related firms. The backlash of dashed expectations -- and lost fortunes -- has been a financial wasteland. Not only has the industry learned that equity money comes hard, and that banks have finite lending limits and rigorous borrowing conditions, but they have also learned the brutal reality of "once burned -- thrice shy." That reality is the single greatest pressure point today.

It is good that investors look to more substantive performance on the part of industry participants. But the latent fear has precipitated a self-propelling condition that is both dangerous and unrealistic, its own "Catch 22" dilemma:

> Unless a company demonstrates consistently improved earnings and cash flow, it is a poor investment . . . But a company that demonstrates such improvements while a good investment, doesn't need it.

Without equity, companies must use expensive debt financing, which drains the bottom line. Lower profits create and sustain the image of a "poor investment." And companies with a lease or rental composite, lacking the cast to finance it, are in an even tighter vise. The Darwinian effect of this cycle will weed out the unfit, sure; but we must not weed out the infants as well -- strong, young companies who bring new ideas and technologies legitimately to market, as the "go-go" backlash perversely does in some cases.

THE BEHAVIORAL BOTTLENECK -- a case of technological indigestion on the part of those who use computer products. Part of the immunity and glamour syndromes was the long-held belief that the markets for computer products had a limitless capacity to absorb a multiplicity of technologies, products, systems approaches, and methodologies. Implicit in this belief was the adaptability of the user -- that he would and could alter his current ways of doing things just as rapidly as new techniques came along. And in almost every case, the new techniques required of the user that change his way of operating.

What we have learned in the process of industry maturity is that such is not the case. That while the markets are indeed enormous, the rate of product and

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system change must be gated to a process of osmosis in the office environment. Users can and will change to some degree, but the burden of providing products that minimize the change rate is on the supplier. And he must be aware that the markets he serves have over them a membrane, through which will filter, at a predictable and stable rate, all of the new ideas that this imaginative industry can provide.

We have seen the filtering capacity increasingly in recent years; first, in the trauma of changeover to System/360 technology, then in the slowness to adapt to teleprocessing technology, and most recently, in the deferral by IBM of its Future Systems technology -- an indication that users need more time to absorb the technologies of virtual systems. This "behavioral bottleneck" was not as apparent in the past as it is today. And the result, again, was to create unfilled expectations that have returned to haunt the industry at a very bad time.

THE LEGAL LANDSLIDE -- the uncertainty surrounding the outcome of the many antitrust actions taking place today. What was clear and discernable just two or three years ago is blurred and amorphous now. What will happen to IBM? And what will court decisions do to the other competitors? What role will AT&T play? And will it preempt communications markets for others? The questions -- which didn't exist in urgent terms until recently -- have cast a shadow that is long and deep. But it is only a shadow, and if one stands back from the legal process, the only reasonable conclusion can be that there will be an information systems industry; it will encompass many companies; and that there will be a worthwhile business, important for survivors.

* * * * * * *

If that is the case, perhaps we have passed through the worst of the attitude problems that affect the industry. Perhaps we have put the "immunity illusion," "glamour glut," "behavioral bottleneck," and "legal landslide" misjudgments far enough behind us to take a more realistic look at the industry.

If so, what we will see is tremendous underlying strength and uncountable opportunities. It will take a certain set of capabilities for the participants in the market. Not every organization, by virtue of current existence, will continue to compete. There are some factors which are requisite, and we can examine those. Before we do, however, it is important to make the point that the information systems business has inherently good fundamentals -- better, in fact, than most growth industries.

+ There are more offices today than ever, and there will be more tomorrow.

+ There is more information per office today, and there will be more tomorrow as better management techniques evolve.

+ There is a higher time-and-place value on information than ever before; people want it sooner, more directly, and more succinctly.

+ To the extent that information systems can improve productivity and reduce labor intensiveness, the demand is continuing.

Historically, we have seen the industry grow about twice as fast each year as the gross national product . . . it is a good business to be in. What does it take to stay? There are four major considerations -- positioning, fiscal responsibility, product differentiation, managerial reach -- needed for success in the information systems business today. In assessing Inforex . . .

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IBM REALIGNMENT STRESSES COMMUNICATIONS . . .

Among IBM's communications-oriented changes that also are designed to make the company "more responsive to customer needs," the former System Development Div. has been designated the System Communications Div. "consistent with its new mission of designing, developing, and manufacturing computer-based communications systems and terminal products." The announcement said that development work not related to communications has been spread around among the General Products Div., the System Products Div., and the Data Processing Product Group staff.

The other major change announced with the realignment was the apparent demise of the Advanced Systems Development Div., which "had responsibility for coordinating worldwide customer requirements." ASDD responsibilities have been assigned to the System Communications Div., the DPPG staff, and the DP Marketing Group staff. The division's former head becomes vice president for development and manufacturing in the System Products Division.

. . . AS VENTURE INTO SATELLITE COMMUNICATIONS WOULD INCLUDE COMSAT, OTHERS

IBM apparently has decided it is worth making room for a third partner (holding at least 10% ownership in the corporation it sets up with Comsat) and not having majority control of the domestic satellite communications company originally proposed by Lockheed, MCI, and Comsat. The FCC wouldn't allow IBM to buy in with a deal that would give it 55%, Comsat 45%, even though the two partners said they eventually would broaden participation by making shares available to investors.

After initially indicating that FCC restrictions "could be interpreted in such a way as seriously to compromise the development and operation of an efficient, competitive satellite entity," IBM and Comsat have decided to apply under the "balanced CML" option, calling for a third partner. "Since discussions with potential third partners are preliminary," a note accompaning press copies of the letter to the FCC said, "it is premature to disclose their names." It also said that whether IBM and Comsat participate in the venture will ultimately depend on the Commission's approval of future applications.

Potential fears of communications carriers -- and an interesting set of problems for IBM -- were discussed in the May/June issue of Data Communications by Bernard Strassburg, retired chief of the FCC's Common Carrier bureau. "Working under a true arms-length relationship between its communications and computer entities, its sales force would be foreclosed from addressing the communications needs of its computer customers, let alone promoting the virtues of IBM's satellite to seek those needs." He seems to conclude that this is a hamper to IBM, with its proposed system that includes small roof-top antennas at customer locations, that "IBM faces a dilemma for which there is no readily apparent solution."

SYSTEM/32 ADDS APPLICATIONS PACKAGE FOR SMALL MANUFACTURING COMPANIES, ADDITIONAL FUNCTIONS INCLUDE SDLC AND BISYNC COMMUNICATIONS WITH 370

The sheer volume of press material that flows out of IBM's General Systems Division is impressive at first glance. And that's perhaps the way it should be, since the primary thrust of the product is as a problem-solving device for non-computer users within a specific industry. So whenever IBM "invades" a particular industry with an Industry Application Program for its System/32, it's big business for that industry -- very much as if the industry giant had introduced a special computer.

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In the case at hand -- the first IAP announcement since the computer's original introduction, with five IAPs, this winter (EDP/IR Jan.20,1975) -- a thorough effort seems all the more justified since the industry selected -- manufacturing -- includes quite a slice of the total business pie. Perhaps in recognition of this, IBM named its support programs the Manufacturing Management Accounting System (MMAS). It includes nine applications that cost between $18 and $27 a month, after initial charges of $405 to $615 each.

> Support is provided in the financial area of the manufacturing business with Order Entry and Invoicing, Inventory Management, Accounts Receivable, Sales Analysis, Payroll, Accounts Payable, and General Ledger; in the plant floor (and costing) area with Production Status and Costing; and in the engineering (and costing) area with Product Definition and Costing.

The applications can be installed on a stand-alone or an interrelated basis. When Accounts Payable and General Ledger are being used, IBM points out, information common to both need only be entered into the system once. In addition, information generated by one application can be used to automatically update the file of another.

Eight of the applications can be installed in separate stages at different times and still provide an integrated system. The only exception is Sales Analysis, which cannot be installed separately because it depends on information from Order Entry and Invoicing, Accounts Receivable and/or Inventory Management. The programs -- which in total have an initial charge of $4,370 and a monthly charge of $195 -- will be available beginning in August.

Several "computer" features added to System/32

The Atlanta group (Southern Business Machines Corp.?) also used this time to announce additional functions that extend System/32's data file inquiry capability, give it more report writing capabilities, and enhance its communicating functions.

- New capabilities for the Data File Utility (DFU) program announced in January enable users to inquire randomly into the system's data file and to produce reports or selectively retrieve stored records. This will be available, at no charge, beginning in November.

- The System/32's "previously announced SNA/SDLC Batch Work Station (BWS) Utility Program" has been enhanced. When transmitting to a System/370, it will look like a 3770 Data Communication System, and 370 programming support for the System/32 operating under VTAM and the Network Control Program is generated by specifying the 3770 as the supported terminal. This future-oriented capability will be available, at no charge, beginning in November of 1976.

- A new Multi-Leaving Remote Job Entry Work Station (MRJE/WS) Program allows the System/32 to function as an RJE work station over communication lines using the Binary Synchronous Communications Adapter. Used in this application, the System/32 is treated like a System/3 by the host 370. The program will be available as a component of the S/32 system control program in May of 1976.

It's hard to tell if these releases result from customer demand, should trigger demand, or simply are on plan. They surely add another twist to 32 watching.

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• TWO NEW 370 FOES HAVE JOINED THE JAPANESE HITAC FAMILY: the M-160 and the M-170. Previously announced models in the joint Hitachi-Fujitsu series the M-180 and M-190 large and superlarge computers. Technical and marketing information is scarce at the moment, but the new models appear to be the rough equivalents of the IBM 370/145 and the 370/158 . . . and will be marketed internationally, perhaps even in the States.

The smaller of the two systems, the M-160, is a unit processor with up to 2 MB of main memory, no buffer, and an average instruction cycle of 2.1 microseconds. It has a total of 6 I/O channels and a throughput alleged of 4 MB/second. The M-170, with maximum memory of 4 MB, a 16 KB buffer, 1.3 microsecond instruction cycle, and 8 I/O channels has a total throughput claimed of 8 MB per second and can be operated in either single or dual processor configuration. Both systems come with extensive software, including virtual storage management, and both allow the use of a myriad of high-performance peripherals . . . including a separate communications control processor.

Though price and shipment data were unavailable to EDP/IR at press time, Hitachi did call its new offerings "fully competitive on the international market" and claimed that "each employs high-performance, super-high-speed MSI and LSI and surpasses by far the largest computers, both domestic and foreign, in cost performance ratio."

• AN SDLC RIVAL - ALSO BIT-ORIENTED - HAS BEEN ANNOUNCED BY BURROUGHS. Called Burroughs Data Link Control (BDLC), the new data communications protocol is designed to allow a mixing of various terminals and systems on one net. Also, it's compatible with existing Burroughs communications procedures . . . which should assure, says the company, an orderly and evolutionary transfer to the new technology. BDLC bit-stream data transfer -- as opposed to common transmission of data messages in blocks of formalized characters -- allows an information field to vary in length and transmission control to occur right along with data transfer. Burroughs also makes a point of stressing BDLC's conformance to the current and evolving data transmission standards of the International Standards Organization.

• IBM HAS BOWED OUT OF THE ACQUISITION GAME and left Neotec Corporation to its own devices -- mostly of the analytical and electronic-sensory type. As reported in EDP/IR, April 30, 1975, IBM had acquired the option to buy certain assets of the small Maryland company -- including certain patent rights and equipment -- but the Giant has since waived the option. Neotec, it turns out, lost over $2 million on sales last year of just over $3 million and is now looking for ways to refinance and otherwise deal with "a substantial working capital deficit." So exeunt IBM.

• IN A SON OF CARTERFONE DECISION, the FCC has ruled that AT&T cannot exempt a local telephone company (Mebane Home Telephone Company of North Carolina) from the obligation to allow customers to interconnect their own equipment in place of the telephone company's. The exemption had been contained in AT&T tariff filings before the FCC. Independent telephone equipment suppliers view the decision as a victory since the Carterfone decision pertained to interconnection but not direct substitution or replacement of telephone company equipment as with Mebane.

• SYSTEM/3 ENCROACHMENT BY INDEPENDENT PERIPHERALS GOT A BOOST recently from Business Systems Technology with the introduction of two new plug-compatible printers for the S/3 models 10 and 15. The 400 and 750 lpm machines come with buffering and extra paper sensing features and utilize chain-train technology to print 6 copies at once. A leased (1 yr) BST/400 costs $575/mo.; BST/750 costs $850/mo.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JULY 7,1975 • VOL.10,NO.21 P.J.McGOVERN,PUBLISHER

Ring out the old . . .

IBM REDUCES PRICES ON SMALL 370s PLUS MOST PERIPHERALS; DISTRIBUTED DATA ENTRY PLUS TERMINAL INTELLIGENCE SPOTLIGHT FUTURE EMPHASIS

"Fire Sale" was EDP Industry Report's first reaction even while listening to IBM's July 1 telephone call. To kick off the second half of 1975, the company's Data Processing Division -- and many of its World Trade companies -- did three things:

- Announced purchase price reductions of 15% on 370/115 and 370/125 CPUs plus terminal/communication products, and 10% on tape and disk peripherals, printers, and optical recognition equipment.

- Beefed up its 3770 family of terminals with faster printers and -- more important -- offered user programmability (intelligence) for three members of the family.

- Introduced a new line of data entry terminals (the 3760) to replace the 3277 as the keyboard/display station for the 3790 (distributed) communication system.

On further analysis, EDP/IR still thinks its "Fire Sale" conclusion is an adequate summary of IBM's midyear action. By way of explaining its pricing action, an IBM spokesman said:

> *IBM routinely reviews its product pricing in light of many continually changing business factors. We feel that a decrease in purchase prices for the equipment affected by this announcement is appropriate at this time. * * * Both the previous purchase prices and customer acceptance of these products obviously were among our considerations.*

Also among considerations -- it would seem to EDP/IR -- could be listed most or all of the below:

+ Improvement of 1975 revenue/profit picture
+ Increased competition with independent peripheral/terminal manufacturers for the customer's purchase dollar
+ Full commitment to distributed processing
+ Acknowledgement of user requirement for local intelligence
+ Preparation for a new line of CPUs . . . and peripherals?

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New blood for the 3790

In conjunction with a host 3791 controller in an IBM 3790 Communications System, the new 3760 Dual Key Entry Station -- replacing the 3277 Display Station as key entry device in the system -- seems to bring a whole new layer of processing power out toward the data source. With the new terminals feeding into and off of the 3791's fixed disk, new editing, validating, arithmetic and other automatic functions are available at the user's end . . . and, as before, the 3791 is capable of generating reports locally on a variety of low-speed printers.

And where previously the 3790 needed its source program compiled at the mainframe, now, according to IBM, with the 3760s in the system "there is no loading of the software required from the mainframe."

Communication with a VS 370 mainframe is handled by the 3791 via direct connection or SDLC, and a new no-cost Batch Transfer Program acts as traffic cop between the computer and the controller, directing the transfer of data from the 3791's fixed disk to the mainframe's console, printer, disk or tape systems.

The 3760, to be available late this year, comes in two models. Model 1 is the basic unit, while Model 2 is a functionally identical expansion unit that plugs into a Model 1. Each Model 1 can support up to two Model 2s. Details:

- Each comes with two operator positions, keyboards, and 236-character gas panel displays. Up to twelve 3760s may be hung off one 3791 controller (eight of which may be Model 1s) for a total of 24 operator positions. The 3760s are connected to the controller by cable with a maximum distance of 2000 feet.

- Function keys enable operators to insert, enter, store, or verify data with one keystroke, and an operator prompting ("fill-in-the-blanks") capability is also available. Data security is provided via passwords and optional keylocks.

- A 3760 Model 1 rents for $258 under MAC, $220 under a 2-year ETP and costs $9,240 to buy; a Model 2 rents for $141 under MAC, $120 under ETP and sells for $5,040. For comparison's sake, a 480 character 3277 Display Station -- the old 3790 key entry device -- rented for $81 and cost $3,460. No ETP was available (clue to the coming 3760?).

IBM says its 3790 system with the new 3760 terminals is "designed primarily for centralized data entry, which involves a relatively large number of key entry units in one location," but the company admits that decentralized use is possible . . . and seems to consider it a feather in the new system's cap.

Terminal transplant

For users choosing to enter their data into the processing stream directly -- through the use of interactive terminals -- IBM's enhancements to its 3767 and 3770 terminal product lines are significant. Says IBM:

- New models of the 3767, 3771, 3773, and 3774 communications terminals will be available in early 1976 with faster (120 cps vs. 80 cps) bidirectional printers. For the 50% increase in printing capacity, users will pay $40 more a month under ETP -- a 13-18% rise.

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EXACTLY WHAT IBM PRODUCTS CAN NOW BE BOUGHT FOR LESS?

In its "Fire Sale" announcement of July 1, 1975, IBM announced price reductions for small System/370 CPUs and many peripherals. The reductions apply to the following products (and purchase option accruals of up to 50% of the new reduced price will apply):

15 Percent Reduction	10 Percent Reductions
370/115 CPU and memory	3410 & 3420 magnetic tape drives
370/125 CPU and memory	3330 series of disk storage drives
3270 information display system	3340 direct access storage facility
3704 communications controller	3203 & 3211 printers
3705 communications controller	1287 & 1288 document readers
2740 communication terminal	3881 optical mark reader
2741 communication terminal	3886 optical character reader

- A new model 3776 will be available next winter with a 400 lpm printer instead of the current 300 lpm unit. A 30% increase in print speed will be accompanied by a 15% increase in price.

- A few months later, user-programmable models of the 3773, 3774, and 3775 will be available. For program execution, the models will have internal storage varying from 4K to 22.5K bytes. In addition, the 3774 and 3775 will have a 99.8K byte fixed diskette. Minimum programmability will add $50 a month to a 3773's ETP payment, $125 for the others.

- Application programs for the three programmable terminals can be assembled from IBM prepared statements -- tailored to suit -- and transmitted from the 370 to the terminal's diskette. Programs on the diskette can be called into the terminal's internal storage by the operator, the mainframe, or another application program under execution.

- Optional 480-character gas panel displays are available for the 3774 and 3775 terminals. Cost for one is $3,200 purchase, $80 on 2-year ETP.

With these additions to its terminal family -- all part of the Advanced Function for Communications IBM announced last fall (EDP/IR, Sept.27,1974) -- IBM seems to jump back into the keyboard mainstream. The functions that IBM expects users to slate for their programmable terminals include editing, validating, formatting and printer forms control. Though perhaps long awaited, this addition of local terminal intelligence and processing capability at the user's end signals a new direction for IBM . . . a sign of what's coming down the pike for future systems.

Software ligament

Further fleshing out its System Network Architecture -- and deepening its commitment to distributed processing -- IBM also announced two new software packages. Despite their somewhat stuffy appellations, they offer further proof that the Giant is heading onto the jazzy age of networking. They are:

- Telecommunications Control System - Advanced Function (TCS-AF): a program product that allows computers to share terminals and application programs . . . and terminals and application programs to communicate with those on other computers. TCS-AF can run on computers operating

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under IBM's TCAM or on systems with both TCAM and Virtual Telecommunications Access Method (VTAM). It will be available to certain VS 370 users later this year for $1,250 a month. Later releases will follow.

- Telecommunications Access Method - Information Management System/Virtual Storage Interface (TCAM-IMS/VS): a program providing a linkage between TCAM and IMS/VS, IBM's data base software. With the release, some IBM terminals can now be linked via TCAM to the data base processing of IMS/VS. The package -- to be released this month -- costs $500 a month.

The bottom line

All the current announcements (both product and financial) seem, to EDP/IR, to fit well into what might be called IBM's current game plan about the near-term future -- perhaps modified to generate cash sales at the same time production lines are being readied for new products. To explain, we first want to quote exactly what IBM said, in mid-March, in response to "recent press reports speculating about changes in IBM product development plans:"

> *FS was a label that meant "Future Systems." The label is no longer in use, but that in no way implies that our development efforts on products for the future have stopped. While IBM does not comment about such speculation, changes in product development plans are being made all the time . . .*

EDP/IR speculates as follows: Distributed processing is the key to IBM's product plans for the last half of the 1970s. This involves large central processors with vast hierarchical memories for data base storage . . . distributed processing power . . . even "smart" terminals with significant memories of their own.

On the organizational front, EDP/IR sees growing autonomy at General Systems Division, and for World Trade. This is in the face of (or perhaps because of) similar products (most significantly, the hardware of the 3790 is the System/32 . . . the new terminal products have many similarities with the S/32 input/output options). There still seems to be adequate preparation being made for voluntary divestiture . . . no matter what happens in the trial.

* * * * *

IBM TRIAL OFF TO A TORPID START . . . NO SUMMER RECESS IN SIGHT

As the first lap of the U.S. vs IBM antitrust marathon seems to be settling down to a bumpy back-country jog, only two sure observations can be drawn from the murky, six-week beginnings that now face a long, hot summer: (1) early estimates of a one-year trial were exceedingly optimistic, and (2) the judge's pretrial irritation at delay and lack of cooperation between counsel for the combatants was probably nothing compared to the slow burn yet to come.

Indeed, during the first two days of opening statements from both sides, the visibly irritated judge picked no favorites when it came to chiding lawyers drifting from the point. Opening statements are just a privilege in a non-jury trial, said the judge at one point, and "they will have no weight in my considerations." Tempus fugit seemed to be the message.

In addition, the judge was miffed at IBM executives for statements made outside the courthouse to reporters and for an article in IBM's magazine *Think*, sent to company employees, IBM stockholders, and members of the press. The courthouse

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culprit was no less than IBM's president, Frank Cary . . . and the judge thought his comments on the merits of IBM's case were neither "wise" nor "prudent." As for the *Think* article, the judge felt that if it were general enough in nature (as IBM contends) not to violate the pretrial communication ban, still it "went pretty far." Upshot of the brouhaha was an IBM request to lift the rule.

But the DOJ has soured the judge, too. Information gaps between deposition testimony and direct testimony of witnesses prompted Edelstein to say that in one case the deposition seemed not to have been taken "properly or competently." If many more depositions fall as short as the judge felt this one did, then much pretrial time-saving legal effort has been for naught.

And perhaps what has seemed to irk the judge the most during these opening weeks of trial -- and what portends the worst for the litigation-weary industry -- is its pace. In fact, fear of delay's withering effect -- and wasteful depositions -- has the judge considering the scrapping of the planned summer recess.

Algebra of delay

During the six weeks following the trial's May 19 kickoff, the Justice Department -- first up in the match -- managed to call a total of seven witnesses, some of whom will be called again later, and thirteen trial days were spent in direct, cross-, and redirect examination. The rest of the time was devoted to deposition reading and cross-reading, document introduction, opening statements, and some legal squabbling.

With the government planning to call a total of 67 witnesses and IBM a whopping 424, the arithmetic results are staggering. Compounded by appeals and judicial decision-making, it seems this trial could last forever . . . or, to put it into perspective, longer than the industry was old when papers were first served. To make matters worse, some other delays appear imminent:

- The possible summer recess -- programmed into the schedule before the trial began. Reason for the break is to allow lawyers to complete discovery and deposition phases of the trial segment that deals with issues arising after the case was initially filed.

- The new issues -- stemming from the Justice Department's amended complaint concerning Telex-like violations. IBM argues that these issues belong in a separate trial, and legal wrangling could be drawn out.

- The misconduct hearing -- scheduled originally for July 9, reset to October 16. Lawyers for each side have hurled misconduct charges -- serious allegations coming from such a normally fraternal set -- and the judge must attend to them. How long it will take is moot.

So, factoring in these known delays and guessing at the unknown ones, EDP/IR wouldn't be surprised to see the trial itself take well over two years. It's a bear. And meanwhile, there's giant AT&T waiting in the wings . . . .

Battle plan

The government's efforts to date center predictably on the notion of what constitutes a relevant market . . . and the issues and assertions of the DOJ lawyers parallel closely the department's pretrial brief (EDP/IR,Feb.27,1975).

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Once it's established that IBM had indeed a marketplace hegemony during the time of the alleged antitrust violations, the government hopes to show -- using primarily IBM's own words as deposed and contained in documents, letters, memos, and even slide shows -- that IBM's marketplace actions were deliberate attempts to monopolize the industry.

Among its showcase witnesses are included such early industry potentates as J. Presper Eckert, coinventor of the first electronic computer (ENIAC) and now a Univac vice president; Robert E. MacDonald, President of Sperry Rand Corporation; Dr. Nicholas C. Metropolis, Group Leader of Los Alamos Scientific Laboratories; and Max Palevsky, former Chief Executive Officer of Scientific Data Systems, now a part of Xerox Corporation.

Thrust of the DOJ questioning has centered around the question of what is and what is not a general-purpose computer (vis-a-vis a special-purpose or scientific computer), and how large was and is IBM's share of that market. Also brought up were IBM's practices in the educational market. Depositions and documents which the DOJ read into the record so far are of IBM extraction (some of CDC vs. IBM vintage) and center on IBM's internal measures of market statistics.

For its part, IBM has parried -- devestatingly in some cases -- the government's points by undermining witnesses credibility based on irrelevant expertise (how much fact in those days, how much hearsay), by pointing out that many of the IBM documents introduced so far were written by lower echelon personnel, by educing statistics that point to volatile (hence unmonopolized?) growth in the industry, and by arguing in general that IBM's actions were actually reactions to market pressure and that, in some cases, the company did what it did simply because everybody else was doing it . . . or because the government wanted it that way.

Along the way, IBM lawyers moved for dismissal or, failing that, a summary judgment by the court. It was a pro forma request, and Edelstein turned it down, maintaining that the case can be efficiently and fairly tried.

By the time of the recess, the government should be just about done presenting the relevant market part of its case. After that will come enumeration of specific acts and intentions that the government hopes will show IBM deliberately set out to acquire or maintain monopoly power . . . and just the intent to monopolize alone, according to the DOJ, violates the Sherman Antitrust Act. Chief among these acts and IBM's intentions are bundling, introduction of so-called "fighting machines," and discrimination in setting educational allowances. IBM's counter to the allegations -- and DOJ logic -- is expected to follow closely that in its pretrial brief (EDP/IR,Feb.27,1975).

Econometdygook

Like the Telex case, this one could make or break on the issue of relevant market . . . so an expert was brought in to explain the nature of monopoly. He was Dr. Frederick Scherer, an economist for the Federal Trade Commission on leave from the University of Michigan.

His testimony held little cheer for Edelstein.

For, although he testified at length about the nature of relevant markets -- from both the customer's point of view and the supplier's point of view -- and stated that he had made determinations of economically relevant markets based

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Lawyers at La Brea

Typical of the legal wrangling that eats up so much time in this case is that spawned by IBM's request for census data from the Department of Commerce. Requested over a year ago, the information would ostensibly give IBM a chance to compare competitors' testimony with census input about market share. IBM also claimed it would show the DOJ notion of relevant market to be myopic.

The DOJ, of course objected, but within a few months the request was narrowed and it seemed that the parties came to a tenuous agreement that at least some of the information would be produced.

Enter the Commerce Department. Though working for the same Uncle as the DOJ, the Secretary of Commerce refused to turn over the information on the grounds that it was confidential and he had executive privilege. Though Judge Edelstein was leary of IBM's contention that it really needed the data, he was riled by the Commerce Secretary's intransigence . . . and hinted that he might go along with IBM part of the way. He mentioned the recent Supreme Court ruling that even the President of the United States had to obey a proper subpoena for information. The hassle dragged on . . . .

Then, last Monday, Edelstein settled the matter, ruling finally that IBM didn't need the documents -- especially since the DOJ didn't have access to them either. He cited the need for census privacy and pointed out that there were already vast amounts of data available from other sources.

So much for that tar pit. Until appeal, that is . . . .

on all of the many criteria he discussed, *each case is different and factors must be constantly juggled in coming to conclusions as to the structure of a particular market*. He admitted no special knowledge of the computer market.

When it came to monopolies he saw two approaches to definition: the structural approach (market share, production economies, etc.) and the behavioral approach (pricing policies and actions). And though he talked at length about the barriers to entry that might indicate monopolization of an industry -- or pricing power -- he said time and time again that he could state *no simple quantitative rule that allows economists to say a firm is inside or outside a given market, that entering a market will be worth the risk, or that a given firm has become a monopoly power*. He was on the stand for three days.

Throughout Scherer's testimony, the judge repeatedly stopped the proceedings to clarify both questions and answers . . . but it seemed to courtroom observers that he considered the responses more frustrating that enlightening. And although the trial's importance lies much beyond Judge Edelstein's personal pique at what he termed "The snail's pace of the trial," he is nevertheless its conductor. And in a way, he is the mirror of us all.

EDP/IR coverage

The trial will be long, and EDP/IR feels it unnecessary to recount each nuance of testimony, every judicial sneeze. But it's also momentous, so every several months we will recap events to date as we have here. Through International Data Corporation's commercially available Trial Reporting Service, we have daily reports from the courtroom . . . so we are tuned to any significant new developments.

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• IN CASE YOU WANT YOUR OUTPUT TO PIROUETTE IN 3-D, CDC has announced a new high-performance graphics terminal and associated software routines called the Control Data 777-2 CYBER graphics terminal and Interactive Graphics System. The 777-2, successor to the less flamboyant 777-1, includes one to three display consoles, a 16-bit controller with 24K words of memory expandable to 65K, a 300-card-per-minute reader, and a synchronous communication interface. It's for use with CDC 6000 or CYBER 70 computers.

The software adjunct to the new terminal provides capabilities for users to "create, display, rotate, store, retrieve and modify two or three-dimensional forms, as well as enter data directly." With the interactive system, data manipulation and mathematical calculations are carried on in the host computer, while visual feedback, console operations, and display modifications take place at the terminal controller. Software routines nest in both locations. Purchase price for the 777-2 terminal (with display unit, controller, reader and communication interface) is $132,000. Standard software costs $800 with a $400 monthly royalty. Also included in the 777-2 announcement were software routines for lower cost, less powerful graphics displays.

• FUTURE FLASH GORDONS WILL BE TRAINED WITH THE HELP OF SPERRY UNIVAC, which recently won an $8 million NASA contract in connection with the Shuttle Mission Simulator (SMS) at the Johnson Space Center in Houston. The money will buy an 1100/46 multiprocessor with semiconductor memory to anchor the computer complex associated with the SMS. It, in turn, will be used to train ground and flight crews prior to the first orbital flight of the Space Shuttle Program in 1979. The Univac kit-and-kaboodle includes the 1100/46 with a 524K words of main storage, 393K of extended storage, eight new Univac 8433 disks, eight Uniservo tape drives, a Communications/Symbiont Processor with 98K bytes of memory, and extraneous card readers, punches, terminals, and printers.

• FOR FORGETFUL IBM 370/135s, INTEL HAS A MEMORY SYSTEM that doubles the IBM main memory capacity of half a megabyte. The one megabyte Intel offering, dubbed the "in-7135" attaches to a user's CPU in place of a service door, making it easy to access. The "in-7135" will be the first memory system manufactured by Intel to be marketed by the company directly to end users . . . previous systems have been funneled through leasing companies. A typical 192K system on a two-year lease will cost less than $3000 a month, including maintenance. Three, four, and five year leases are also available.

• HEADING FOR THE HEARTLAND IS ITEL CORPORATION, a computer leasing, investment and services company, which has reached an agreement in principle to acquire Central Data Systems (CDS) of Cleveland. CDS is a services outfit and will be absorbed into Itel's Data Services Group. CDS had revenues for its fiscal 1975 of $9.5 million and will cost Itel $3.5 million via stock transfer. Itel had 1Q 1975 revenues of $38 million, up 30% from 1974, with a net income over $2 million.

• WHODUNIT WAS THE QUESTION ASKED OF COUNSEL last week, according to an article in the June 25, 1975, issue of Computerworld. The mystery centered around a fallen ashtray in the room where IBM locks its files. The ashtray supposedly fell from a tabletop to the floor while the room was locked and empty. Upon inspection, IBM attorney Thomas Barr and District Court Judge David Edelstein decided that the files were apparently still secure . . . but Barr has asked for a complete audit of the files just in case (shades of Watergate?). On its part, the court has taken steps to fully secure the windows to the room.

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"THE GRAY SHEET" JULY 18,1975 • VOL.10,NO.22 P.J.McGOVERN, PUBLISHER

Rationale for the recent sell-off

WINCHESTER TECHNOLOGY ADAPTED TO TWO NEW IBM STORAGE DEVICES; GSD INTRODUCES A NEW SYSTEM/3, REDUCES PRICE ON OLDER MODELS

"We feel that a decrease in purchase prices for the equipment affected . . . is appropriate at this time."

That's how IBM explained its "fire sale" earlier this month when it reduced prices on most peripherals (EDP/IR July 7, 1975) including the 3330 and 3340 disk units. At least one reason this was quite "appropriate" came to light this week as IBM introduced "two direct access devices that use advanced technology to provide high-capacity online data storage."

The two new devices -- both of which take advantage of Winchester technology -- have moveable heads, but not removable packs. They offer more to 3340 and 3330 users at lower costs per byte:

+ The 3344 direct access storage device "is an extension of" and actually must attach to a 3340 drive. It has the same performance characteristics, but stores four times as much data -- 280 megabytes/drive compared to 35 or 70 MB for the 3340, depending on which module is used.

+ The 3350 direct access storage device "offers the highest performance characteristics of any IBM moveable-head disk device." It has more than 1.5 times the capacity of the 3330 (over 300 megabytes/spindle) as well as 1.5 times the transfer rate.

+ Unlike the 3330, both the new drives are available with a fixed-head capability (as is the 3340). The 3344, with one megabyte available, offers twice that of the 3340-70, the 3350 a little more than one MB.

So IBM users know their disk storage migration path; they are now in a better position to decide whether or not they should purchase the older storage products that are now offered at 10% reduction. Interestingly, it looks as if those users planning or contemplating the use of the 3850 (IBM's large, tape cartridge mass storage device) should opt for the purchase of 3330s. These must be used for the staging of data from the 3850, and the new 3350 -- even though it can operate in a lower-capacity, 3330 compatible mode -- cannot be used for such staging. Both the 3350 and 3344 are for use with IBM 370/135s and up.

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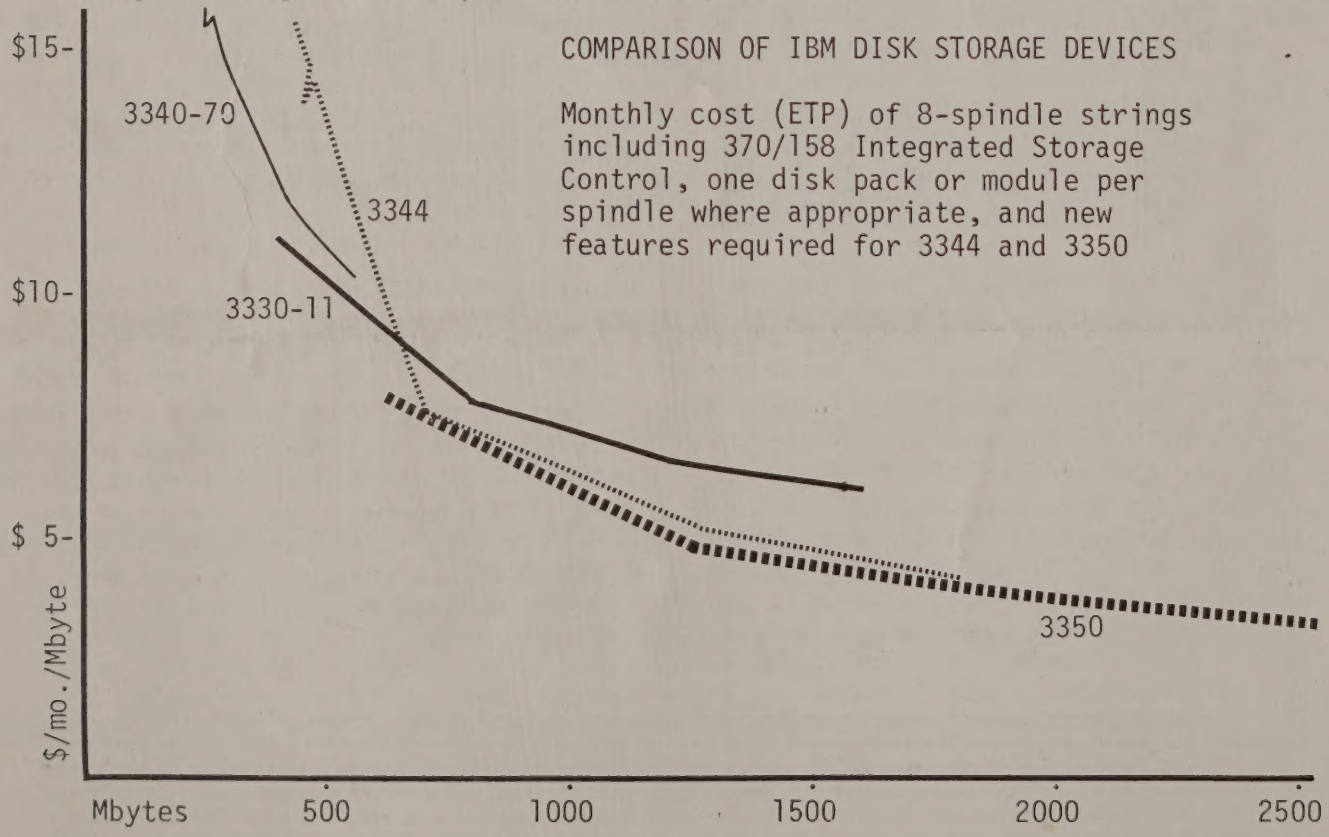
COMPARISON: IBM'S NEWEST DISK PRODUCTS VS. PREVIOUS OFFERINGS

	3350	3330-11	3344	3340-70
Capacity (Megabytes/spindle)	317.5	200	280	70
Average seek time (millisec.)	25	30	25	25
Average latency (millisec.)	8.4	8.4	10.1	10.1
Data transfer rate (Kbytes/sec.)	1,198	806	885	885
Fixed head capacity (Mbytes/spindle)	1.14	---	1.0	0.5
$/mo. (ETP) for 8-spindle string	6,021	7,306	5,212	3,369
$/mo./Megabyte in 8-spindle string	2.37	4.57	2.86	6.02
Capacity of 8-spindle string (Mbytes)	2,540	1,600	1,820	560

The 3350 and 3344 -- similar in physical size and appearance to IBM's 3340 -- are slated for customer shipments, respectively, the first and second quarters of 1976. They are supported by OS/VS 1 and 2 as well as VM/370. Also, DOS/VS will support the 3344 and the 3350 when operating in 3330 Mod. 1 mode. The actual technology of the new storage devices was not made public in the announcement.

But it certainly confirms that Winchester technology is today's pacesetter, and probably will determine yet another round of on-line storage. Furthermore, most of the peripherals to support a new system are here. So if IBM's "Fire Sale" roster is any indication, announcements still in the "Coming Events" section include optical input devices, small/medium processors with built-in communications.



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IBM'S GSD ANNOUNCES A NEW MODEL SYSTEM/3, TUNES PURCHASE/LEASE RATIO

"IBM System/3. A Family of Computers You Can Grow With."
-- headline, Wall Street Journal Ad

Thus stamping the family concept onto the System/3 product line, IBM's General Systems Division (GSD) announced the newest member of the clan, the Model 12, and simultaneously trimmed purchase prices on aging core memory models. In addition, the Atlanta-based division introduced a System/32-like Term Availability Plan (TAP) that effectively knocks 5% or so off monthly bills on the newer models of the System/3 line for users signing on for three years.

It was GSD's contribution to IBM's midsummer price/product melee (see also EDP/IR, July 7,1975), and what it seemed to say was threefold:

- Indeed, the System/3 should probably be considered a computer family distinct from other IBM offerings . . . just as GSD may eventually be from the rest of IBM. Along with the System/32, it could make GSD a billion dollar company by 1976 . . . certainly the leader in the marketplace for small computers (page 5) that will grow from $3 billion installed (YE74) to almost $5.4 billion five years later.

- GSD is maturing, its autonomy growing. From a development and manufacturing division conceived in 1969 along with the first System/3, GSD has grown into IBM's small systems arm -- a busy area these days. In 1974 GSD was given domestic sales and service responsiblity for its products, in 1975 the System/32 was announced, and most recently the division's mandate has been enlarged to include product development on a worldwide scale. (Before, GSD products were developed for use in the States . . . with the IBM World Trade Divisions free to treat them as they pleased.)

- While the new prices for the Model 6 and 10 contribute to the "fire sale" kitty apparently called for by IBM Corporate, the new model and new TAPs beef up the product line. GSD's family is now more competitive with the rest of the small business systems, minis, and sophisticated accounting machines appealing to first-time users.

All in the family

Two years ago -- almost to the day -- IBM announced a new top-of-the-line System/3, the Model 15. In its coverage at that time, EDP/IR pondered the whys and wherefores of the evolving product line . . . and some of those musings seem just as relevant today as they were then:

> In the process [of adding S/3s], it seems to EDP/IR, IBM is developing a family of computers. It may try to link them together with communications, more dependent on big, centrally located 370s, but a base is already there . . . a base sufficiently large to supply . . . [independent] companies with a market for their products . . . a base perhaps isolated enough to become a separate entity, ready to compete with System 370 from below.

So into that "family" now comes the Model 12, nestling comfortably into the middle and bringing Winchester (a new model, the C2, with 92 MB maximum) capabil-

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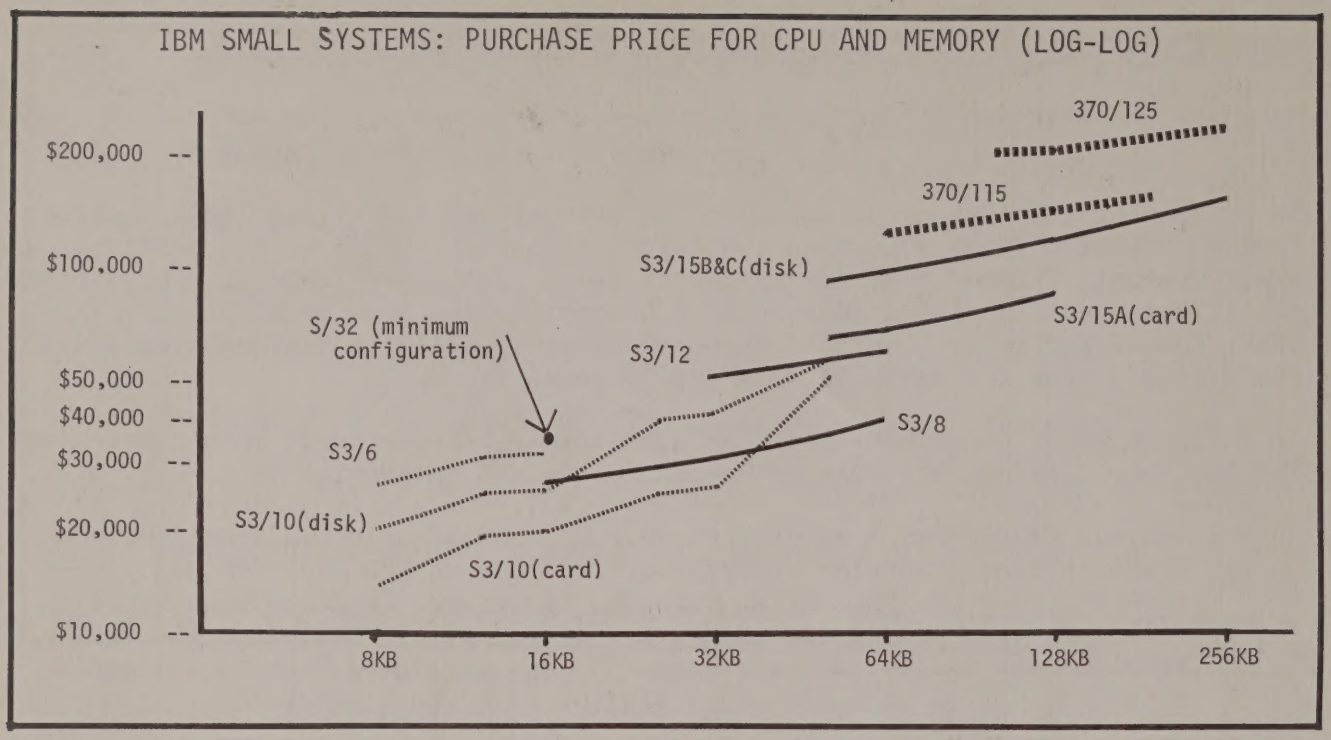

ity lower than before. It joins the Models 8 and 15 in the use of semiconductor memory and the Models 10 and and 15 in maximum printing capacity (1100 lpm) and data entry with or without punch cards. Like all but the Model 6, it can also support a 3410/3411 magnetic tape subsytem.

Though two of the five current System/3 models are now "not in new production" as IBM terms it -- the cardless Model 6 and first-born Model 10, both core memory machines -- it's a family on the go. The Model 15 saw first customer shipments last March (the large memory models went out last month), the Model 8s hit the streets this April, and the new Model 12s are due for shipment next June.

The S/3 niche in the IBM total computer line is shown in the chart above -- a plot of CPU and memory capacity versus price. Note the different curves for semiconductor and core machines . . . and the 370 overlap.

Market environment

Along with the size class information inserted into its General-Purpose Computer (Group A) Census (pages 6&7), International Data Corporation, publisher of EDP/IR, has projected installed bases of the size classes through 1979. These are shown in the table on page 5. The classes are based on IBM's product line. Though market shares of the various vendors within a size class may vary, the figures show System/3's class losing ground between now and then -- while System/32's gains. But lumped together, the two -- GSD's domain -- will show a net growth.

With the S/3 family expanding with new models, bigger memories, and more peripherals providing upward mobility for users growing within the IBM fold -- and the S/32 roping in new users -- GSD products could continue to set market penetration records for years. EDP/IR loyalty studies, for instance, show that in recent years about 75% of all first-time users went with a System/3 . . . giving GSD a bigger market share than IBM as a whole. And considering IBM's visible commitment to the line -- assurance to jittery users that the S/3 won't be wiped out with one fell swoop of "FS" -- the line looks a little meaner, a little tougher these days.

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GENERAL PURPOSE (GROUP A) COMPUTER INSTALLED BASE BY SIZE CLASS
YEAREND 1974 - YEAREND 1979

	IBM Equiv.	Installed 12/74 # Units	Installed 12/74 $(M)	% of Tot $	Installed 12/79 # Units	Installed 12/79 $(M)	% of Tot $	$ Growth Factor
Class 1	S/32	-	-	-	55,200	$2,210	5%	-
Class 2	S/3	29,700	$3,047	10%	28,900	3,150	6	.76 .03
Class 3	370/115	14,200	2,831	9	15,000	3,150	6	.11
Class 4	370/125-135	13,600	8,453	28	16,200	10,530	22	.25
Class 5	370/145	4,300	5,660	19	6,800	9,390	19	.66
Class 6	370/158	2,550	6,991	23	4,700	13,370	28	.91
Class 7	370/168	660	3,217	11	1,400	7,000	14	1.18
		65,010	$30,199	100%	128,200	$48,800	100%	.62

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Fighting the S/3 machine

By lowering S/3 purchase prices -- and perhaps more importantly by offering the TAPs -- GSD not only added to the general stir begun with last fortnight's System Development and World Trade Divisions price cuts . . . but also may remove some of the vulnerable spots at which competitors have been happily chipping away.

Not only will the purchase price cuts on the older models precipitate buyers out of the rental base (and generate cash!) . . . but TAP availability lowers monthly payments, attractive to first time users. (To protect itself against inflation, though, IBM hedges its TAP bet by reserving the option of raising prices up to 5% a year -- the same deal it offers with the System/32. At worst, next year's TAP price could be this year's MAC.)

IBM's adjustment of the purchase/rental (P/R) ratio (40 under MAC, 42 under TAP for a basic new model S/3) brings it more in line with the competition. A Burroughs B 700 basic system, for instance, has a P/R ratio of 41, a B 1700 about 43. Honeywell's Level 61 hits about 43, while the 62/40 "Liberator" hits 44. NCR Century Systems have multiples lower than 40 (peripherals run about 45, however), while the big NCR and Burroughs accounting machines run even lower.

But is competitiveness the only reason for the shift in price structure? And what's behind the apparent corporate call for cash? In issuing the company's financial results for the first six months of 1975, IBM's F.T. Cary said:

> Financial results continue to be adversely affected by inflation and significant declines in outright purchases of data processing equipment. While the level of purchase activity is somewhat higher than the first quarter of the year [$1.025 billion vs. $900 million], it is still below the very high level of the second quarter of 1974. Incoming orders continue below the rates of 1974.

And whether there's any more to it than that may not matter . . . at least to those who'll be pitting their machines against the toughening family of System/3.

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GENERAL PURPOSE COMPUTER CENSUS

Counts in the General Purpose Digital Computer (Group A) Census, shown below, are based on the best information available to the International Data Corporation -- but they are definitely estimates. Computer manufacturers, as a rule, do not directly supply this type of information. It is only through the use of IDC's extensive data files and other information sources that estimates such as those in this Census are possible. The computers included in Group A comprise the bulk of digital computers (by value) in operation. These machines are byte or character oriented -- with the exception of large-scale scientific computers that have large words -- and are primarily programmed with higher-level languages. In addition to this Census, EDP/IR publishes a Dedicated Application Digital Computer (Group B) Census that includes minicomputers and specialized-purpose machines.

Also, the Group A Census now includes the classification of computer models by size class -- based on the IBM product line (rather than constantly shifting average system values) and what other manufacturers' products compete with which IBM computers. There are seven size classes in all based as follows: Class 1 -- S/32; Class 2 -- S/3 (Mod 6 to 12); Class 3 -- 370/115; Class 4 -- 370/125&135; Class 5 -- 370/145; Class 6 -- 370/158; Class 7 -- 370/168. In a way, these classifications are arbitrary . . . so comments and suggestions from readers are more than appreciated.

AS OF APRIL 1, 1975

NAME OF MANUFACTURER	COMPUTER MODEL	SIZE CLASS	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
IBM	System/32	1	$ 900	3/75	50	-	50	8,000
	System 3/6	2	$ 1,750	12/70	3,075	1,900	4,975	-
	System 3/8	2	$ 1,900	6/75	-	-	-	150
	System 3/10	2	$ 2,550	1/70	17,075	8,100	25,175	1,600
	System 3/15	3	$ 4,650	3/74	1,600	550	2,150	1,750
	370/115	3	$ 7,450	4/74	1,000	670	1,670	900
	370/125	4	$ 11,250	6/73	1,875	1,080	2,955	825
	370/135	4	$ 17,500	5/72	2,830	1,620	4,450	490
	370/145	5	$ 31,700	7/71	1,950	1,005	2,955	145
	370/155	6	$ 60,300	2/71	665	440	1,105	-
	370/158	6	$ 67,500	5/73	685	240	925	300
	370/165	7	$102,000	6/71	145	70	215	-
	370/168	7	$126,700	7/73	168	48	216	95
	370/195	7	$198,300	3/71	20	4	24	-
	360/20	3	$ 3,675	12/65	2,300	3,810	6,110	-
	360/22	3	$ 5,900	7/71	525	220	745	-
	360/25	3	$ 7,650	10/68	410	800	1,210	-
	360/30	4	$ 11,400	6/65	2,650	2,120	4,770	-
	360/44	4	$ 14,500	7/66	51	73	124	-
	360/40	4	$ 20,400	6/65	1,230	1,455	2,685	-
	360/50	5	$ 32,700	8/65	573	478	1,051	-
	360/65	6	$ 70,700	11/65	428	203	631	-
	360/67	7	$114,200	6/66	31	12	43	-
	360/75	7	$ 95,900	1/66	32	15	47	-
	360/85	7	$143,800	10/69	5	4	9	-
	360/95	7	$153,000	11/67	14	2	16	-
	1130	2	$ 2,350	2/66	2,420	1,780	4,200	-
	1401	3	$ 3,775	9/60	820	785	1,605	-
	1401-G	2	$ 2,350	5/64	65	25	90	-
	1401-H	2	$ 1,325	6/67	23	38	61	-
	1410	4	$ 17,350	11/61	80	48	128	-
	1440	3	$ 4,800	4/63	150	155	305	-
	1460	4	$ 10,000	10/63	48	36	84	-
	1620	3	$ 2,750	9/60	270	222	492	-
	7010	5	$ 26,500	10/63	13	7	20	-
	7030	7	$163,200	5/61	3	1	4	-
	704	5	$ 32,600	12/55	1	1	2	-
	7040	5	$ 25,500	6/63	9	15	24	-
	7044	5	$ 37,200	6/63	8	10	18	-
	705	5	$ 38,800	1/56	3	3	6	-
	7070-74	5	$ 27,500	3/60	95	35	130	-
	7080	6	$ 61,200	8/61	41	1	42	-
	7090-94	6	$ 71,900	8/60	53	9	62	-
	Subtotals				43,489	28,090	71,579	14,255
NCR	Century-50	2	$ 2,050	2/71	1,155	245	1,400	200
	Century-100	3	$ 2,980	9/68	770	950	1,720	-
	Century-101	3	$ 2,850	10/72	1,125	185	1,310	600
	Century-151	3	$ 3,500	2/75	18	5	23	110
	Century-200	4	$ 8,000	9/69	630	390	1,020	-
	Century-201	4	$ 10,000	8/74	60	13	73	115
	Century-251	4	$ 10,000	11/73	110	44	154	105
	Century-300	5	$ 22,600	2/72	42	25	67	7
	304	4	$ 10,000	1/60	5	-	5	-
	310	2	$ 1,000	5/61	13	10	23	-
	315	3	$ 5,000	5/62	305	358	663	-
	315-RMC	4	$ 11,800	9/65	54	44	98	-
	390	2	$ 800	5/61	220	135	355	-
	500	2	$ 1,150	10/65	680	1,375	2,055	-
	Subtotals				5,187	3,779	8,966	1,137
Philco	1000	3	$ 7,000	6/63	8	1	9	X
	210/211	5	$ 40,000	10/58	6	1	7	X
	212	5	$ 52,000	1/63	6	1	7	X
	Subtotals				20	3	23	X
Singer	System 10	2	$ 2,550	10/70	1,198	852	2,050	350
Standard Computer Corp.	IC-4000	3	$ 9,000	9/68	4	-	4	X
	IC-6000	4	$ 16,000	5/67	3	-	3	X
	IC-7000	4	$ 17,000	6/69	7	-	7	X
	Subtotals				14	-	14	X
Univac	1/II	5	$ 26,500	3/51	3	2	5	-
	III	5	$ 26,900	8/62	30	35	65	-
	SS-80/90	4	$ 8,500	8/58	13	17	30	-
	418-I/II	4	$ 14,500	6/63	68	60	128	-
	418-III	5	$ 20,800	7/69	44	55	99	-
	491/492	5	$ 28,600	12/61	16	12	28	-
	494	6	$ 44,300	2/66	52	45	97	-
	1004	2	$ 1,100	2/63	790	715	1,505	X
	1005	2	$ 1,730	4/66	580	180	760	-
	1050	4	$ 9,325	9/63	146	135	281	-
	1103/5	6	$ 37,100	12/50	-	3	3	-
	1106	6	$ 42,400	12/69	94	139	233	22
	1107	6	$ 60,400	10/62	6	13	19	-
	1108	7	$ 72,800	9/65	130	97	227	-
	1110	7	$ 90,100	6/72	33	45	78	-
	1100/20	6	$ 43,300	4/75	-	-	-	40
	1100/40	7	$113,300	7/75	-	-	-	30
	9200	2	$ 2,530	6/67	1,125	860	1,985	-
	9300	3	$ 4,300	9/67	855	860	1,715	-
	9400	4	$ 12,300	5/69	265	297	562	-
	9700	5	$ 22,900	8/72	10	17	27	-
	90/30	5	$ 8,700	2/75	30	20	50	800
	90/60	5	$ 17,200	1/74	110	37	147	140
	90/70	5	$ 23,300	11/73	32	20	72	72
	Subtotals				4,452	3,664	8,116	1,104
	301	4	$ 7,060	10/60	117	6	123	-
	501	5	$ 17,100	6/59	8	-	8	-
	3301	5	$ 24,100	7/64	52	0	52	-
	Spectra 70/15	3	$ 4,200	9/65	11	-	11	-
	Spectra 70/25	3	$ 7,400	9/65	2	2	4	0
	Spectra 70/35	4	$ 13,000	1/67	85	5	90	-
	Spectra 70/45	5	$ 24,000	11/65	235	18	253	-
	Spectra 70/46	5	$ 40,400	11/68	30	2	32	-
	Spectra 70/55	5	$ 38,400	11/68	7	2	9	-
	Spectra 70/60	6	$ 44,500	9/70	19	-	19	-
	Spectra 70/61	6	$ 50,000	3/71	10	-	10	-
	Spectra 1600	3	$ 3,800	1/69	65	-	65	-
	Spectra 70/2	4	$ 12,600	7/71	104	-	104	-
	Spectra 70/3	4	$ 20,400	10/71	19	-	19	-
	Spectra 70/6	5	$ 32,200	10/71	44	-	44	-
	Spectra 70/7	6	$ 39,900	10/71	21	-	21	-
	Subtotals				829	35	864	-
	Totals				5,281	3,699	8,980	1,104

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Burroughs	B-200 Series	3	$ 5,600	11/61	70	55	125	X
	B-300 Series	3	$ 5,200	7/65	315	65	380	X
	B-500	3	$ 6,000	11/68	445	430	875	X
	B-70X/71X	2	$ 1,300	3/73	250	143	393	180
	B-72X	2	$ 2,000	4/75	-	-	-	30
	B-1712	2	$ 2,100	8/72	240	130	370	130
	B-1714	2	$ 2,250	8/72	365	208	573	170
	B-1718	3	$ 3,500	11/74	5	-	5	30
	B-1726	3	$ 5,900	2/73	190	63	253	85
	B-1728	3	$ 8,300	8/73	90	40	130	80
	B-2500	4	$ 8,900	2/67	165	105	270	X
	B-2700	4	$ 8,700	8/72	180	105	285	85
	B-3500	4	$ 16,000	5/67	575	317	892	X
	B-3700	4	$ 22,600	11/72	95	45	140	60
	B-45/4700	5	$ 27,300	10/71	180	125	305	60
	B-4790	5	$ 41,000	11/75	-	-	-	30
	B-5500	5	$ 35,000	3/63	80	28	108	X
	B-5700	5	$ 29,500	12/70	22	7	29	X
	B-65/6700	6	$ 57,500	11/69	90	70	160	18
	B-7700	7	$120,000	8/73	6	2	8	3
	B-7750	7	$135,000	9/75	-	-	-	1
	Subtotals				3,363	1,938	5,301	962
CDC	G-20	4	$ 19,600	4/61	3	5	8	X
	1604/A/B	6	$ 42,000	1/60	17	4	21	X
	31/3150	4	$ 9,100	12/64	82	47	129	X
	3170	5	$ 19,200	12/70	13	15	28	X
	3200	4	$ 14,700	5/64	46	44	90	X
	3300	5	$ 29,900	9/65	108	83	191	X
	3400	5	$ 23,700	11/64	4	8	12	X
	3500	5	$ 26,000	1/69	10	17	27	X
	3600	6	$ 49,000	6/63	12	8	20	X
	3800	6	$ 53,000	12/65	19	3	22	X
	6200	6	$ 39,000	11/70	2	6	8	X
	6400	6	$ 54,000	5/66	60	50	110	X
	6500	6	$ 74,800	12/67	20	15	35	X
	6600	7	$119,600	8/64	58	30	88	X
	6700	7	$125,000	7/70	3	-	3	X
	7600	7	$171,600	1/69	14	6	20	X
	Cyber 72	5	$ 36,300	10/71	29	40	69	6
	Cyber 73	6	$ 51,700	3/72	19	40	59	8
	Cyber 74	7	$115,500	3/72	5	7	12	2
	Cyber 76	7	$165,000	3/72	2	3	5	2
	Cyber 172	6	$ 41,200	6/75	-	-	-	11
	Cyber 173	6	$ 54,600	6/75	-	-	-	12
	Cyber 174	6	$ 67,500	6/75	-	-	-	3
	Cyber 175	7	$ 84,000	6/75	-	-	-	2
	Star-100	7	$250,000	12/73	1	-	1	2
	Subtotals				527	431	958	48
Digital Equip. Corp.	PDP-6	4	$ 10,000	10/64	16	8	24	X
	1040/1050	4	$ 13,300	10/67	184	74	258	15
	1055	4	$ 22,000	12/71	28	11	39	4
	1070/1077	5	$ 30,000	6/72	20	3	23	5
	1080	5	$ 30,000	6/75	-	-	-	1
	Subtotals				248	96	344	25
HIS	Gamma 10	2	$ 2,500	7/64	-	950	950	-
	Gamma 30	4	$ 10,100	2/62	-	130	130	-
	G-5X Series	2	$ 1,650	1/66	670	3,100	3,770	-
	G-100 Series	3	$ 4,100	4/66	235	1,450	1,685	-
	G-200 Series	4	$ 14,000	4/61	160	45	205	-
	G-400 Series	4	$ 16,650	5/64	248	330	578	-
	G-615/25/35	6	$ 73,300	4/65	46	43	89	-
	G-645	7	$112,400	7/66	2	1	3	-
	G-6025	5	$ 22,200	11/73	35	13	48	-
	G-6030/40	5	$ 37,000	6/71	85	110	195	-
	G-6050/60	6	$ 52,000	7/71	90	50	140	-
	G-6070/80	6	$ 68,900	7/71	37	13	50	-
	G-6180	7	$102,000	2/74	3	-	3	-
	G-Subtotals				1,611	6,235	7,846	-
	H-105/115	3	$ 4,350	3/70	1,315	510	1,825	-
	H-110/120	3	$ 4,050	1/66	360	250	610	-
	H-125	4	$ 8,400	12/67	60	245	305	-
	H-200	3	$ 6,500	3/64	380	185	565	-
	H-2020	3	$ 2,400	2/73	440	50	490	-
	H-2030	3	$ 5,150	1/73	85	14	99	-
	H-2040	4	$ 9,900	4/72	315	110	425	-
	H-1015	4	$ 12,750	4/71	105	58	163	-
	H-2050	4	$ 14,800	4/72	190	60	250	-
	H-12/1250	4	$ 12,700	2/66	260	140	400	-
	H-2015	4	$ 18,300	2/71	100	55	155	-
	H-2060	4	$ 21,000	4/72	95	20	115	-
	H-2200	4	$ 20,000	1/66	110	45	155	-
	H-2070	5	$ 25,300	5/72	65	11	76	-
	H-3200	5	$ 27,400	2/70	65	28	93	-
	H-4200	5	$ 31,600	9/68	24	5	29	-
	H-2088	6	$ 44,900	4/72	5	1	6	-
	H-8200	6	$ 74,500	2/69	22	4	26	-
	H-4/1400	4	$ 13,500	12/61	18	21	39	-
	H-800	5	$ 29,100	12/60	30	10	40	-
	H-1800	6	$ 46,900	7/64	7	4	11	-
	H-61/58	2	$ 1,950	1/75	70	280	350	475
	H-61/60	2	$ 3,300	1/75				
	H-62/40	2	$ 3,800	1/75	15	45	60	425
	H-62/60	3	$ 4,300	1/75				
	H-64/20	3	$ 7,400	1/75	6	23	29	275
	H-64/40	4	$ 12,700	1/75				
	H-66/10	4	$ 18,300	7/75				
	H-66/20	5	$ 23,300	1/75				
	H-66/40	5	$ 36,200	1/75	83	41	124	275
	H-66/60	6	$ 48,800	1/75				
	H-66/80	7	$ 90,000	1/75				
	H-68/60	6	$ 70,000	3/75	-	-	-	4
	H-68/80	7	$100,000	1/75				
	H-Subtotals				4,225	2,215	6,440	1,454
	HIS-Totals				5,836	8,450	14,286	1,454
Xerox	Sigma-5	4	$ 12,650	8/67	252	58	310	-
	Sigma-6	4	$ 20,000	11/70	40	8	48	-
	Sigma-7	5	$ 24,700	12/66	87	22	109	-
	Sigma-8	4	$ 19,000	9/71	25	9	34	-
	Sigma-9	6	$ 44,000	11/71	42	8	50	-
	530	3	$ 3,500	8/73	240	53	293	180
	550	3	$ 7,525	11/74	35	6	41	70
	560	4	$ 17,030	11/74	8	1	9	13
	940	5	$ 24,000	4/66	50	4	54	-
	9300	3	$ 8,500	11/64	20	4	24	-
	Subtotals				799	173	972	263
TOTALS					65,962	47,511	113,473	19,958

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• BURROUGHS IS BURROWING INTO DATA COMMUNICATIONS IN A BIG WAY THESE DAYS with two new products for use in data nets -- a new B 700 model and a new TC series -- and both feature use of Burroughs' new line protocol (BDLC) and the unique Burroughs software "interpreter." The terminal series, dubbed the TC 5100, comes in four models each with a maximum memory of 32K bytes . . . 4K to 16K of which can be for the user, the rest for control software and read-only diagnostics software. They also come with a 60 cps matrix printer and "Self-Scan" display panel of 256 character capacity. Communication speed for the systems can range from 75 to 9600 bits per second.

Software with the terminals provides such features as the "interpreter," which interprets high-level application language compilers and optimizes their use of main memory; a look-ahead feature at the microinstruction level; a hardware interrupt system and system diagnostics (System Confidence Test Routines); and COBOL applications programming. Two of the models come with tape cassettes and will be available shortly, while the other two will have minidisks and become available 3Q 1976. Monthly lease prices range from $430 to $780, purchase prices from $13,900 to $25,000.

The new B 700 Series communications processor, the B 776, is also suited to BDLC and uses an "interpreter" for language compilation. A new operating system, the Communications Control Program, rides herd over the system . . . which can include 8K to 65K bytes user memory, a 32K byte control memory, up to two separate data communications processors (6K word memories), up to nine peripheral I/O controls, and a real-time clock. Memory access is governed by its own microprocessor -- as are the data communication processors and other controllers. Peripheral options include printers up to 750 lpm, tape cassettes, 9-track tape drives, industry-compatible floppy disks, disk cartridge drives of up to 9.2 MB storage each, and 80-column card equipment.

In addition to supporting COBOL and RPG high-level user languages, the B 776 also runs on Burroughs' Network Definition Language (NDL) and Message Processing Language (MPL). The Communications Control Language can handle the concurrent operation of up to six programs in a multiprogramming mode. First deliveries of the B 776 are scheduled for late this year and prices will vary according to the application and the particular configuration of system that is chosen. A typical system, to be used as a data concentrator would have a purchase price of $68,230, a monthly lease price of $1,550.

• BY JACKING UP MEMORY CAPACITY AND JACKING DOWN PERIPHERAL REQUIREMENTS, XEROX has lowered the entry-level costs of its Xerox 560 and doubled its main memory max to 2 million bytes (by doubling core density). The new peripherals -- a 300 lpm printer, a 45 ips dual density tape drive, and a single spindle 49 MB disk drive -- will lower the cost of a minimum configuration by 12%, the company says. A new disk unit for the 560 was also announced capable of storing 188 million bytes.

• A NEW TIMESHARING DEC DATASYSTEM, THE 350, HAS BEEN ANNOUNCED by the minicomputer leader. Three models, ranging in price from $20,000 to $70,000, make up the series and will be available this summer. The systems can operate either standalone or in networks. Each system can support up to four terminals and is built around a PDP-11/10 of 32K to 56K memory. Disk and floppies provide mass storage.

• FOR THE FIRST SIX MONTHS OF 75 THE MAJOR MAINFRAMERS STACK UP THUSLY: IBM gross income up 8%, earnings down 1%; Burroughs revenue up 11%, earnings up 16%; CDC revenues up 9%, earnings down 13%; NCR revenues up 15%, earnings up 3%; Honeywell revenues up 3%, earnings down 51%. Univac's haven't been released yet.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JULY 30,1975 • VOL.10,NO.23 P.J.McGOVERN,PUBLISHER

Requiem for a lightweight

XEROX CALLS IT QUITS IN THE MAINFRAME BUSINESS, STARTLES USERS & EMPLOYEES FUTURE OF XDS AND PRODUCT LINE CLOUDY

The future of xerography continues bright and the process itself is capable of further dramatic advances. But Xerox is really a new company, both in the nature of its markets and the range and relationships of the products and services it provides. As we enter the 1970s it is no longer accurate to analyze the company's future and its success solely in terms of copying and duplicating.

Probably one of the greatest challenges for corporations in the 1970s will be to recognize that neither precedent nor tradition tells us much that will help us cope with a future in which change is accelerating with unbelievable rapidity. Yet, if we can select the proper strategies for Xerox, the opportunities for profitable growth are as great as or greater than ever . . .

. . . The acquisition of a computer manufacturer, Scientific Data Systems, Inc., in May of last year, provides us with a key link in the chain of information services which we feel can lead to a great future business.

-- XEROX Corporation 1969 Annual Report

If we ever get afraid to stick our necks out, we'll be just another big corporation.

-- Peter McColough, XEROX Chairman
to Forbes, August 15,1972

Yeah, well, crow is cheap this week.

-- disgruntled Xerox user

After six years and over a billion dollars of unprofitable investment, Xerox Corporation directors finally decided it was better to dine on crow than continue pumping money into mainframes . . . and what was once a vision of the office copier giant vying with IBM, the computer giant, for business product leadership in the automated offices of the future. And though many have thought that Xerox's waning slice of the computer market -- and profit losses in a once heady and money-making (accounting practices notwithstanding) growth company before the Xerox take-

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over -- meant the company's eventual attrition . . . the decision to exit was so closely guarded that it came as a surprise to Xerox people, users, and watchers. As a result, the future of Xerox Data Systems (XDS), nee Scientific Data Systems, remains hazy. No one knows quite what's to come of the product line . . . or its users and their investment in the Xerox way.

Perhaps the only clue, in fact, to the tightly-kept secret -- which had no effect on new product announcements (EDP/IR,July 18,1975) or advertisements in the trade press -- was the breakout of the company's computer operations into a separate division this spring . . . a better backdrop for close corporate scrutiny.

And what that scrutiny revealed was that it would be another five years or so before the division would reach the break-even point -- and only after the addition of $150 to $200 million for a new computer line to introduce by then. To the directors it was too much good money after bad. "We have decided not to make substantial future investments in computer mainframes so we can devote our resources to the parts of our business which are more promising and profitable," said the company's chairman and chief exec, C. Peter McColough.

To cover the losses that discontinuing computer operations will incur, the directors then voted to write off a cool $84.4 million in after-tax profits, cutting the company's earnings per share to a nickel (from $1.12). The surgery is scheduled to take up to a year and a half, says the company, and will not affect Xerox Computer Services or the Diablo line of miniperipherals and terminals.

Customer base adrift

One user that EDP/IR talked to put it this way: "Our reaction runs from dismay to downright anger. It seems they've pulled the rug out from under all our plans with one flick of cigar ash in a smoke-filled boardroom. Two years ago we went through hell justifying our decision to go with Xerox, and now we're stuck. Even if someone takes it over, we'll either have to wait two years for the new software to interface our stuff with their new unannounced gear -- or if it's some shoestring operation, for the chapter elevens to start flying about. We're the guys stuck in the middle."

But that user may have been a single, isolated hardluck case. Others that EDP/IR talked with accepted the news with more of a ho hum. "I don't think we'll miss 'em much," said one. "We're pretty well used to getting along on our own, and we have all the gear we need."

The reason that the Xerox decision may not be all that shattering to its customers -- as say the RCA one was in 1971 -- lies in the nature of the customer the company serves. Building on SDS's inroads into the scientific and engineering communities, Xerox machines have traditionally gone to universities and government labs interested in interactive applications along scientific lines. Hence they have managed to operate without the dependence on the vendor that seems to go along with more commercial, business-oriented DP.

In addition, many of the Xerox sites are multivendor ones . . . where the Xerox equipment handles only a small portion of the workload.

As for the two big timesharing houses -- Comshare and Tymshare -- that depend on Xerox computers, both voiced little concern for the near future (equipment levels currently up to snuff). In fact, because of experience with software de-

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XEROX AND THE COMPUTER BUSINESS -- SOME DATA

The Xerox installed base, as the yearend 1974 compilations below indicate, is different from the norm. Only about 20% -- less than $150 million at original purchase price -- is owned by Xerox and being rented or leased to users.

	U.S.#	U.S.$M	Intl.#	Intl.$M	W.W.#	W.W.$M
General Purpose	757	$ 440	158	$ 91	915	$ 531
Dedicated Application	998	143	206	33	1204	176
TOTAL	1755	$ 583	364	$ 124	2119	$ 707

Market Structure by Industry -- Percent of U.S. Base (by Value)

Description	All Manufacturers	IBM	Xerox
Industrial Subtotal	28%	29%	19%
Service Bureaus	15	14	36
Education	6	5	19
Federal Government	10	7	22
All Other	41	45	4

velopment and equipment maintenance, both companies thought that there might be some "business opportunities" for them in Xerox's demise. A Tymshare spokesman, for example, even went so far as to hint that when XDS goes on the block, his company might look for a piece of the action.

In the meantime, rumors fly as to who, if anyone, will take over XDS . . . the most interesting being that it would (should?) be a minicomputer competitor of DEC looking to broaden its product line in the timesharing end. (The wildest rumor has a major oil company looking for a place to hide excess profits . . . .)

Twilight kickers

What happens to the product line now? Will there be any more software or peripheral enhancements between now and the final curtain? Will there be any attempt to increase revenue from the computers on rental out there now?

"It's too early to tell, we're trying to sort out a number of things," was the answer given to EDP/IR to these and other questions by stunned Xerox spokesmen. And though the company pledges to honor all contractual obligations to current users and to deliver the current backlog of 100 systems . . . it's a lame duck commitment. One user EDP/IR talked to had already cancelled orders for two Xerox 560s and knew of others that would be bailing out also.

And that same user echoed industry observers that cite the timesharing capabilities of Xerox iron when he talked about his future plans and the cancelled 560s: "Well, I guess I'll have to switch to DEC. No place else to go."

Among the survivors . . . Diablo

As one of the few Xerox acquisitions that hasn't seemed in hindsight to have been ill-advised, Diablo offers its parent company not only revenues of about $25 million a year in the growing minidisk market of which it commands the leading

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share . . . but also the best chance perhaps for fulfillment of that automated office vision. For the Diablo "daisy wheel" printer is yeoman in the Xerox 800 Electronic Typing System (ETS) -- probably IBM Office Product Division's most serious challenger in the area of computer-based word processing.

The ETS, with 350 cps capability in playback and removable storage media, is considered better priced and more versatile than the fixed-storage IBM memory typewriter. With the addition of communications to the ETS -- and, in another field, of more "intelligence" to its copiers -- Xerox is well placed to fight the Giant for business product leadership.

So, once burned in the computer room, Xerox may find its home ground in the upstairs offices fertile enough for the kind of growth it gotten accustomed to . . . and the way to information processing through another door.

The questions that remain now are: (1) How will the axing of XDS actually proceed? (2) How will the exit of another mainframer affect the IBM antitrust trial? and (3) What does Xerox's balk at the weight of the next generation's awesome capital requirements bode for the other non-IBM mainframers? Indeed, some of those other mainframers must be mulling over the same points that the Xerox directors did . . . before voting last Monday to take a powder.

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COM before the storm

COMPUTER OUTPUT MICROFILM HEADS FOR THE 80s; 20% AVERAGE GROWTH FORECAST

Spurred by the onetime boost of the 1972 paper shortage . . . and a rising cost of film supplies that is growing at only a third to a fifth of the rate of paper . . . it seems that Computer Output Microfilm (COM) is finally heading into the respectable regions of computer outputting. By 1980, says International Data Corporation, publisher of EDP/IR, the number of COM units at small, medium and large-scale computer sites will triple . . . from an estimated 1250 units installed in the U.S. as of yearend 1974 to almost 3700 by yearend 1980.

In addition, the use of COM units in specialized COM service bureaus -- which today house 38% of the estimated total 2000 units installed in the U.S. -- will also grow, though perhaps at a slower rate.

In IDC's continuing study of the computer output marketplace, the slow emergence of COM into the mainstream of data processing is seen to hinge on several factors. These are:

- As mentioned, the cost of supplies. In 1974 the cost of paper rose 45 to 50%, while micrographic film costs rose only 10 to 15%. Also, as the cost of record storage for large quantities of printed pages rises, COM attractiveness appreciates. The break-even point for an in-house COM installation is reached when 200,000 to 500,000 original pages per month are produced.

- User awareness. Though COM has been around for almost 20 years, it has only just begun to catch the user fancy. As such well-known firms as Kodak and Bell & Howell (marketing Pertec) educate their public, the concept of COM will seem less alien to the average computer user and potential COM user.

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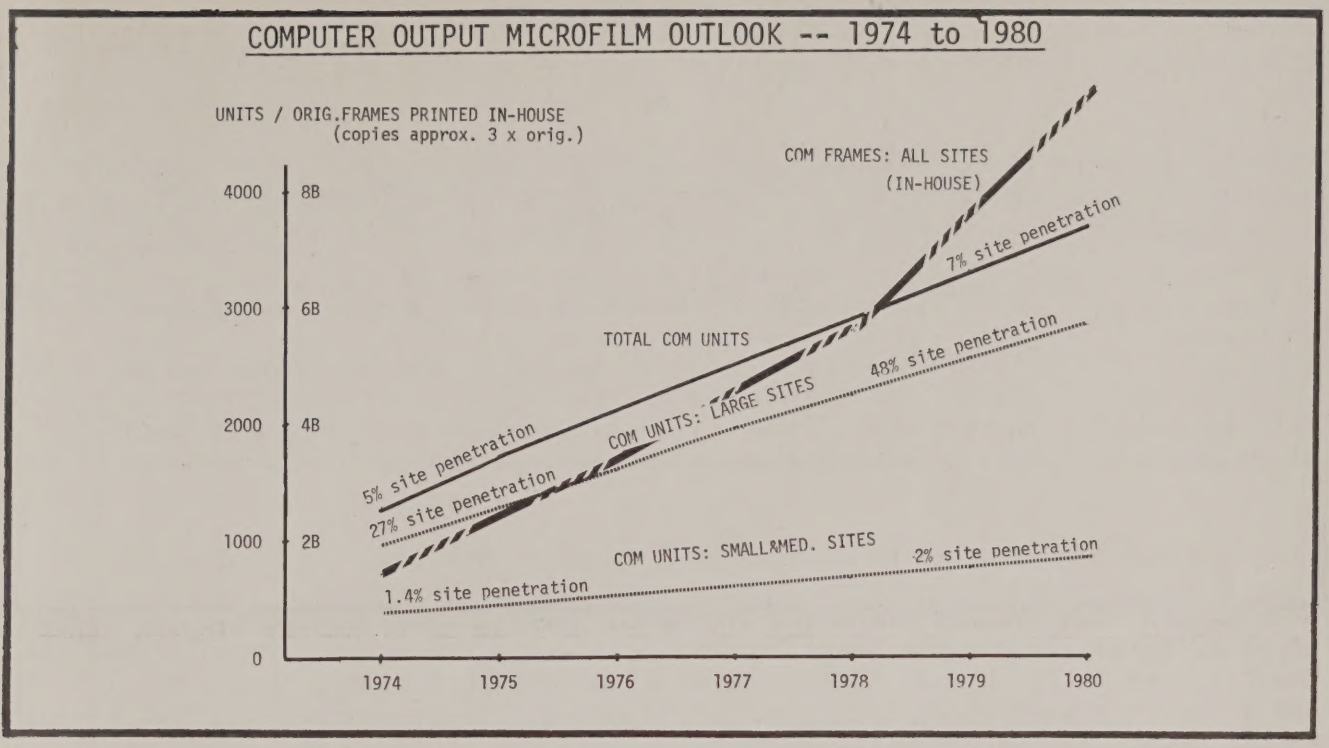

- Equipment price and performance. While the purchase cost of a COM unit in 1958 could easily run $200,000 . . . by 1974 it could be as low as $25,000. By 1980 it's expected to go even lower. At the same time, vendors are adding sophistication to their products -- primarily in the form of minicomputer front-end formatters and/or software.

- Advantages over printers. Not only are material costs less to produce a COM original than one from a computer printer, but the speed of a COM unit generally runs from five to ten times as fast, thus increasing output capability of the computer. COM units also generally have less downtime than printers, sharper images than xeroxed and reduced print copy, and faster information retrieval.

- A fragmented market. Though there are over 20 different COM systems on the market today, only 15 are being actively marketed by a dozen different companies. Of these, only Stromberg Datagraphix has more than 20% of the market (25%). The next three, Kodak, Quantor (NCR), and Memorex account for only slightly over another 40%. Unlike the mainframe or printer business, there is no clear market leader.

COM-mon applications

In 1974, of the roughly one and a half billion original COM frames printed in-house at small, medium, and large-scale computer sites (and twice that number of copies), most went into the file as financial records. In fact, almost 50% of the sites surveyed by IDC claimed financial records as the major application of their COM units, accounting for about 2/3 of their output. The next most prevalent usage was for management reports.

But the study also revealed that COM users are not always taking advantage of their units fully. In many cases, this is because the COM manager is also the DP manager and the installation is relatively new (more COM units have been shipped

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COMPARISON OF COM VERSUS PRINTER

	Stromberg Datagraphix 4500	Kodak KOM-80	Quantor 105	3M EBR	Memorex 1603	IBM 1403N1	Xerox 1200	IBM 3800
Frames (Pages)/Minute	220-170	500-312	200	362-300	141	16-12	60	151
Characters/Line	132-160	132	132	132-160	132	132	132	136,163,204
Maximum Lines/Frame (Page)	80	64	86	64	66	66, 88	66	68
Character Set Size	64,128	82	64, 128	64, 128	64	48, 120	95	255 in 4 sets
On-Off Line	On, Off	Off	Off	On, Off	On	On	Off	On
Output	Roll, Fiche	Roll, Fiche	Fiche	Roll	Roll	Plain Paper	Plain Paper	Plain Paper
Graphic Plotting	No	No	No	No	No	--	--	--
Monthly Rental	$2,200	$1,600	$2,000	$3,100	$900	$1,510	$1,500	$6,250
Purchase Price	$90-160K	$80-110K	$65K	$87K	$44K	$34K	--	$310K

after 1972 than in all the years before then) . . . and he just doesn't have the knowledge to fully utilize COM's unique characteristics. Given time, he'll learn. And almost any printer application that consumes time necessary for DP work could become grist for the COM mill.

For the time being, though, many COM users are performing straight print to COM conversion and -- as the meagre amount of COM that is converted to hard copy would indicate -- most COM is used as computer printed output backup.

COM-plaints

Although users don't seem to object to the same problem in CRTs, the major disadvantage of COM is that you can't write on it. And although the film is more durable and compact than paper, it also can't be viewed with the naked eye. Many COM users complain that viewing equipment causes eyestrain or gives poor blowback quality. Another complaint is that film is not reusable (but since it can be updated, add-on film is enhancing the use of COM).

Besides these built-in drawbacks to COM, two others stand out:

- The industry lacks coherent standards. Each vendor offers a variety of fonts, reduction ratios, etc. -- all to the user's confusion.
- There are system limitations -- such as indexing problems and computer reentry (which also exists with printers).

Developing solutions . . . and COM

In November, 1974, a GAO report to Congress estimated that the use of COM could save the government $1 million a year at the eight federal agencies covered in the report. And with that, the GAO pushed for further funds and energy for the study of COM solutions to computer output problems.

But even with that stamp of approval and growing user acceptance of it, COM faces threat as well as promise in today's emerging technologies. Mass Storage, for example, a la the IBM 3850, could change user requirements, especially with

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the use of low cost terminals. On the other hand, emerging laser technology -- and growing facsimile transmission -- might possibly link with COM in information systems of the future.

Till then, the makers of COM equipment -- as well as the COM services industry that caters to those that can't justify an in-house unit -- should look forward to healthy and relatively unimpeded growth at least until the turn of the decade.

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JAPAN DRAWS A BEAD ON THE FUTURE -- TO USE ULTRA LSI AS AMMUNITION

At the same time that additional models were being announced last month in the Japanese, government-subsidized, new series of computers from Fujitsu-Hitachi (the M series) and NEC-Toshiba (the ACOS series) . . . that same government took initial steps to buttress the Japanese mainframe industry against the threat of IBM's next generation of computers.

The outline of the gameplan -- under the auspices of Japan's Ministry of International Trade and Industry (MITI) and the increased competition that next winter's liberalization of import laws will afford -- is this:

- Nippon Telephone and Telegraph's (NTT) three-year development program for ultra LSI (64KB/chip) will be melded with MITI efforts along the same lines. The goal is to accelerate LSI development to combat IBM advances in its next generation machine, expected by MITI for shipment in force about 1978.

- The LSI project would involve five of the current six Japanese mainframers, organized now into three combines: Fujitsu-Hitachi, Mitsubishi-Oki, and Nippon Electric-Toshiba. The new five-company alignment would link Mitsubishi to the Fujitsu-Hitachi group, and leave the NEC-Toshiba group intact.

- Though Oki Electric is excluded from the development group -- because of lack of experience with super large-scale computers, say MITI officials -- technology would be passed on to the company for use in telecommunications devices.

Though MITI and NTT have agreed to pool their LSI development efforts, the mainframers have yet to give the nod on the regrouping. Hitachi, for instance may have reservations about letting its large industrial rival, Mitsubishi, into the group . . . and Mitsubishi may be reluctant to abandon Oki Electric, in which it has substantial interest. One likely beneficiary of the regrouping, oddly enough, though, may be the U.S.'s own Honeywell Information Systems. HIS has strong ties to the NEC-Toshiba group through cross-licensing agreements . . . and, although Japanese LSI technology has traditionally lagged that of the States, in this case the Japanese group (NEC especially) leads its U.S. partner.

Meanwhile, Fujitsu and Amdahl Corporation, with three 470-V6s shipped and one installed, ponder the mechanics of marketing more of the IBM plug-compatible behemoths . . . and developing follow-on "FS" replacements.

So, if the MITI shuffle goes through and the U.S. evolves as a viable marketplace for the resultant Japanese ultra LSI technology -- MITI has hopes that Japanese exports will increase from less than 1% to 15% or 20% by 1980 -- then IBM brows looking to the west may soon become more deeply furrowed.

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• THOUGH IBM MAY STAR IN THIS SUMMER'S PRODUCTION "NEW PERIPHERALS" -- understudy Univac has at least a walk-on with new equipment for the 90/60 and 90/70 series computer systems. First on the list is a new tape system called Uniservo 14, that features automatic tape loading, dual density, and 7-track format capability. The system has a speed of 60 ips and a maximum transfer capability of 96 KB/sec. A typical Uniservo 14 with controller and two tape units rents for $1331 per month, costs $51K. First deliveries in January.

Due for shipment in the same month will be two new disk systems, the 8405-00 and the 8433. The first is a fixed-head unit with 6MB capacity per pack (up to eight units in a subsystem that will cost $76,800 without controller. The 8433 is a removable disk system that uses industry-standard disk packs and has a capacity of 200 MB per pack (up to 16 units per subsystem.) The cost/unit is $36,480 purchased. Both systems run off the Univac 5039 Control Unit ($57.6K).

Finally out of Blue Bell is news of a new Multichannel Communications Controller (MCC) for expanding communications capability under VS/9. The MCC can handle line speeds from 45 bps to 56K bps and can support up to eight speeds concurrently. Depending on the number of subchannel registers available on the host processor, the MCC can handle up to 59 lines. The first model of the MCC will be available this fall, leasing for a minimum of $1,266 a month.

• ALSO JOINING THE CAST OF SUMMERTIME NEW PRODUCT HOPEFULS IS CDC -- with three new models of Cyber 76 and a new high-capacity disk system. The new Cyber models come with beefed up "small memory" semiconductor storage. Two of the new models combine 65K of 60-bit words of "small memory" to 256K or 512K words of "large memory (core)." The third system has small and large memory capacities of 131K and 512K words, respectively. Previous "small memory" capacities were 32K or 64K words (core). The "small memory" is the primary work area for the Cyber 76 CPU, said the company. The "large memory" is used as a buffer to mass storage devices. The new models run from $104K to $152K/month on a 3-year lease.

The new disk system, the CDC 7639/819, holds 413 million characters on a fixed 22-disk pack with a maximum of four 819s allowed on one controller. Data transfer to and from the Cyber 76 is at a speed of 6.2 million characters/sec., with an average access time of 50 ms. A subsystem and controller would cost $180,000 for a basic system -- or $4,720 on a 3-year lease, not counting maintenance.

• THE LATEST WORD IN THE WORD PROCESSING WORLD is that Burroughs and Redactron have agreed in principle for the mainframer to acquire the Hauppauge, NY, maker of "Redactor" word processing equipment. The agreement calls for Burroughs to swap one share of its stock for thirteen of Redactron's, assuming that stock prices stay somewhat copacetic. Except for having a new owner, Redactron will remain intact, say the two companies. So, hmm, how does this fit in with Burroughs' recent emphasis on data communications (EDP/IR, July 18,1975)?

• CAULKING THE GAP BETWEEN KEY-TO-DISK AND INTELLIGNET TERMINALS, Sycor has announced its Sycor 440 multi-keyboard, shared processor system. It includes a CPU, 5 and 10 million character fixed disks, up to eight VDUs, cassette or floppy interchange media, and a variety of peripheral devices including printers, tape drives, card readers, and communications boxes. Microprocessor-based, the 440 features data entry with concurrent processing and shared files for inquiry/reponse, the company says. An eight keyboard system would cost $1050/month on a 1-year lease.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" AUGUST 19,1975 • VOL.10,NO.24 P.J.McGOVERN,PUBLISHER

Downfall or deliverance?

DP SERVICE COMPANIES EYE INCREASING THREAT OF SMALL BUSINESS COMPUTERS, GLANCE WARILY TOWARD HARDWARE LIAISONS

It was slated to be a routine seminar . . . 25 to 40 members gathering near the bowling alley/shopping center mecca of Paramus, NJ. But before registration had ended, nearly a hundred big, medium, and even small company members of the Association of Data Processing Service Organizations (ADAPSO) had arrived. Their concern? The rapidly growing path of thorns small business computers are creating for the services industry. For some, it was almost a seminar in survival.

The swollen attendance at the ADAPSO seminar (the most successful ever, according to a later press release) clearly reflects an industry-wide concern . . . a concern regularly intensified by developments in the marketplace:

- IBM last winter introduced its System/32 as a turnkey solution for first-time users, legitimizing the small business, computer-ignorant user as a valid hardware customer (EDP/IR,Jan.20,1975).

- Reverberations to System/32 from other mainframers, specifically NCR and Burroughs, brought even more hardware competition -- both small computers and sophisticated accounting machines -- into this marketplace traditionally the haunt of service companies (EDP/IR,Feb.12,1975).

- The standalone commercial DP market emerged as a growth area for minicomputer manufacturers as DEC, Data General, Hewlett Packard et al found themselves beset with microprocessor competition in some low-cost, high-volume applications. There were additional profit squeezes as the business became one of constantly dropping equipment costs.

- Additional factors -- the growing trend toward national and international networking by large service companies, tighter corporate controls demanding in-house networking or dispersed turnkey business systems -- began cutting into the domain of the smaller service bureau.

Thus, the attendees were concerned, attentive . . . for they were dealing with the real world. There were a lot of war stories. And these were the guys in the trenches . . . the service bureaus that deal on a day-to-day basis with those $500,000 to $5,000,000 businesses, candidates for small computers.

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And behind the specific marketplace events affecting service companies, some basic forces are at work . . . driving the services industry to change:

- Hardware costs are dropping. The inevitable progression -- learning curves at work -- is finally bringing the price of an in-house computer within reach of the nearly half million small businesses in the U.S. that have been doing without. Many of these companies have traditionally relied on the local service bureau for data processing . . . and they see a shift as progress.

- As a corollary to the above and as a result of software technology advances, interactive/transaction-driven systems are encroaching on the old standby of batch processing. As on-line systems, data base management, and teleprocessing percolate through the user base, traditional over-the-counter processing is bound to diminish. Terminals and CRTs hooked to home office computers or service networks -- or totally new information appliances that obviate a certain amount of number-crunching -- will replace the printouts that used to come back over the counter. Call it autotransaction.

The hardware barrage

Understandably enough it's been the System/32, like a crystal dropped into a supersaturated solution of alternatives, that has precipitated decision-making on the part of many of the service organizations. Hence the seminar, hence its attendence. It's time to cope.

More recently, IBM has added three more Industry Application Packages (IAPs) to the five originally available for the System/32 . . . Burroughs has announced an L 9000 accounting machine to further close the gap between that line and the bristling B 700 series . . . NCR just this week announced two new top-end models of its 399 "accounting computer," both disk-based (see page 8).

Then there are the mini vendors. Since 1972 when International Data Corporation, publisher of EDP/IR, began tracking the phenomenon, minicomputer usage in business applications has grown from 10% to 14% of units installed. Thus, mini shipments in this area well outpace the 25% growth expected for this year. And that's just units. By value, since the standalone business systems typically cost more than their scientific or OEM counterparts, an increasing portion of revenue will come from the commercial sector. Underscoring this trend, for example, is Computer Automation, a heavily OEM-oriented outfit which has just created a new Commercial Systems Division and acquired a systems software package to better attend to the end-user market.

So, regardless of the definition of a "small business computer" (is it a System/32? Basic/Four? NCR 399? DEC PDP/11?) . . . the services vendors must come to grips with them . . . either fight 'em or join 'em.

DPSOs as hardware jocks

The hardware vendors want them to join 'em. "Become a distributor for us, a dealer," they pitch. "After all, we have large advertising budgets, national and international marketing operations -- and the pole position in the hardware race to distributed computing, teleprocessing, decentralization, etc. What's more, your customers want our stuff. You can be the one to sell it to them."

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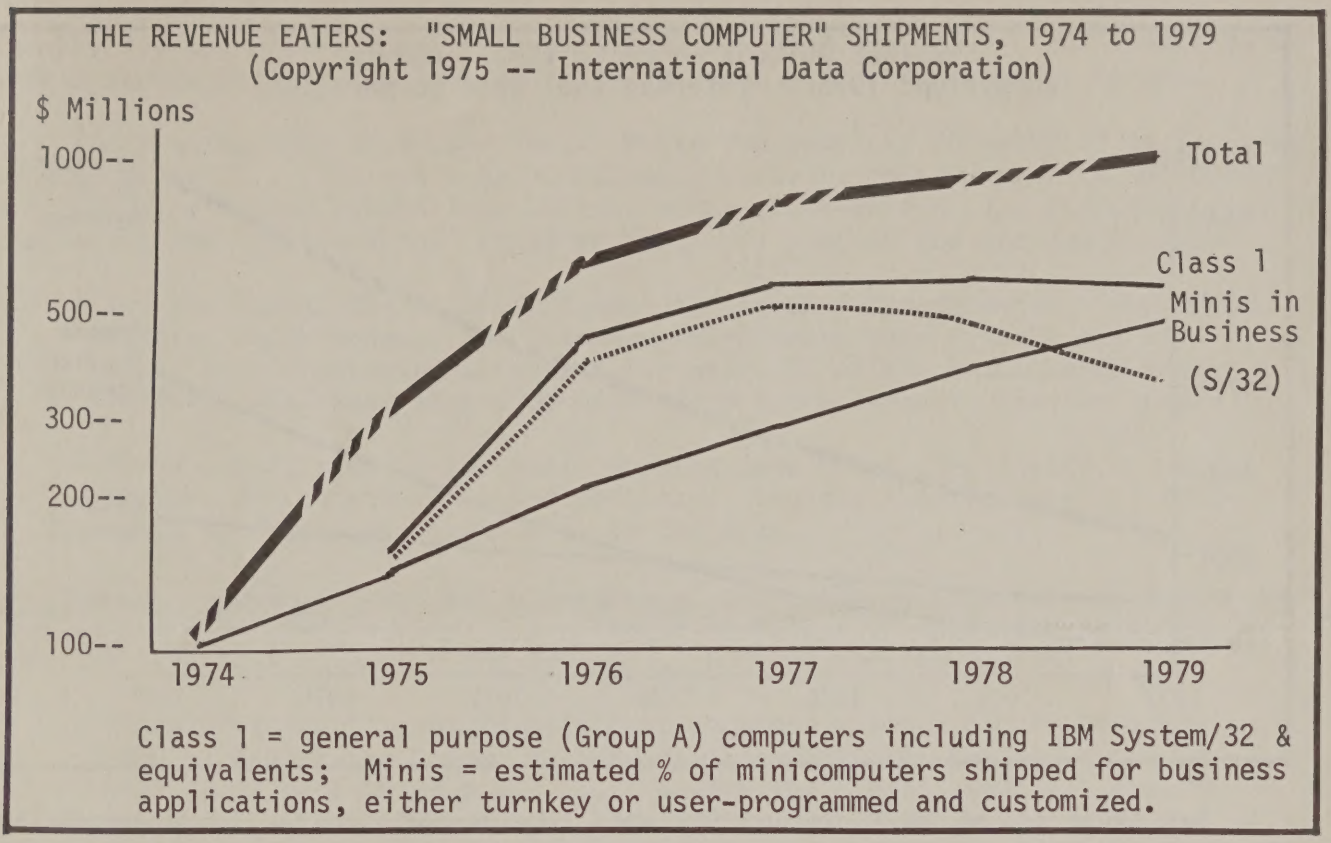

But the service guys are wary. What the hardware vendors like DEC, Data General, and Basic/Four don't have are support and service organizations geared to ferreting out and handholding each and every hinterland user who might want a small computer. "We sell iron," is the mini maker adage . . . and despite growing end user emphasis and software sophistication, it's still what they do best. Service organizations fear being used in a marketing and service relationship . . . then left holding the bag when problems arise after the vendor has made his sale.

"Sure, you guys can help the mini vendors sell their equipment," pointed out one panelist. "Sell minis, fall on your own swords, and go out gracefully."

But survival -- and success -- may lie in such hybrid liaisons. The service organizations' strength is in knowledge of the local markets . . . markets often eccentric, computer-naive, and unwilling to be punched, folded, and spindled to the standard mini or small business computer's regime. Though leery of getting mired in software quicksand (one hard-bitten vet called it "deadly poison"), the service bureaus are looking for ways to cash in on their industry-specific expertise. Some are doing it already, with modular "canned" applications packages overlayed on a mini and designed to be easily modified. As one member described it: "The customer gets the suit off the rack and you do the alterations."

It may even pay to align with the Giant. At the rate IBM is cranking out Industry Application Packages (about one a month), the demand for turnkey software for the System/32 is far outstripping supply. Industry rumors peg the hit rate of S/32s going out without IAPs as 70% . . . and a spokesman for the System/32 wing of the National Association of IBM System/3 Users thinks that's not far off. Many of the current and future S/32 users he knows are simply not waiting for IBM to produce an IAP for their particular industry . . . instead they are doing their own or contracting out for applications software.

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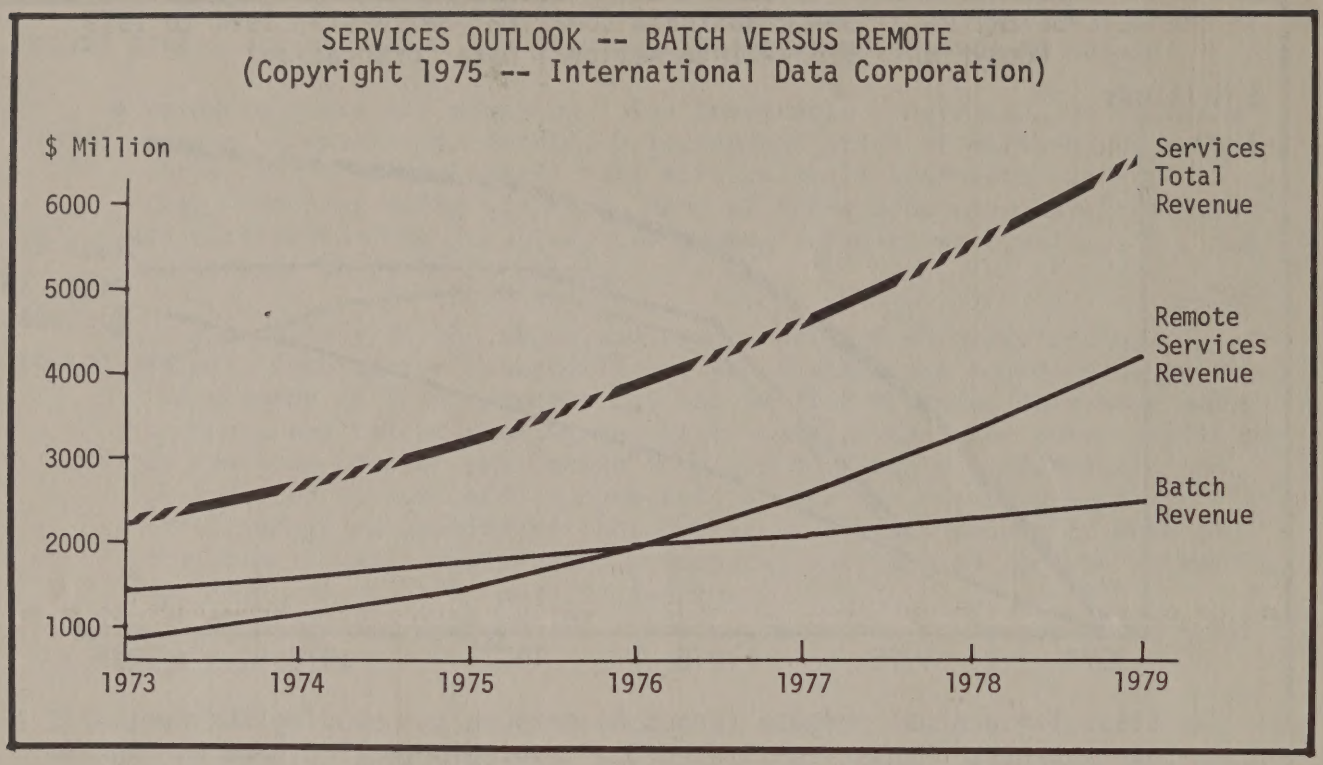

But there are pitfalls to any liaison. The vendor must be chosen carefully, the equipment selected, contracts worked out, development costs accurately estimated. Personnel must be added and trained, demo gear installed. User documentation -- almost a make or break factor -- must be complete and accurate. And salesmen must be taught how to sell hardware -- without cutting into solid services accounts . . . and the continuing revenue they represent.

Should they take the plunge? "Look," comes the reply, "if my customer is gonna bolt to an in-house system, I might as well be the one to sell it to him."

Batch erosion . . . and learning to cope

The heart of the services industry has always been simple batch processing . . . and it still is today. In 1974, for instance, International Data Corporation tabulates that almost 60% of all services revenue was for batch processing. The remainder went to remote services of various kinds. Two-thirds of 1974 revenues went for transaction-type processing (user data with service bureau software) and 82% of that was batch processing. But times are changing:

- By 1980, transaction-type batch services will drop to a little more than a third of all services revenue . . . representing 95% of all batch services. Batch growth will average less than 10% a year.

- In contrast, remote access/immediate response-type services will grow about 30% a year to over $3 billion in revenues by 1980. Remote-batch services will be earning over $1 billion a year by then.

Another way to look at it is from the autotransaction standpoint. In 1974, services (primarily batch) accounted for half of the total autotransaction market (see EDP/IR, April 30, 1975, Review and Forecast) . . . but by 1980 that share will be only about 30%. Meanwhile, a massive infusion of information appliances and

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turnkey systems will take up the slack with a tenfold increase. Autotransaction itself should be a $10 billion industry by then, five times what it is now.

The writing then is on the wall. While the services industry is in for some healthy growth . . . it won't be bloodless. Hardware and software technologies are funneling demand toward interactive, transaction-driven data processing and weathering the "future shock" could be tough for some of the service bureaus:

- For one thing, the industry itself is terribly fractionated. The two largest batch houses, for instance, Electronic Data Systems and Automatic Data Processing accounted for only 11% of the total batch market in 1974, with less than $200 million in batch revenues between them.

- For another, many of the small outfits have heavy investments in older batch-oriented equipment and software. Capital requirements and resistance to change may leave some in the dust.

Caught between a "rock and a hardplace" then, the service bureaus are beginning to exercise their options . . . taking advantage of their knowledge of markets and the users' changing requirements. Some of the techniques:

- Installing intelligent terminals at customer sites. Fedder Data Systems, for instance, uses its own brand terminal to provide customers with local processing power . . . saving the bigger, tougher jobs for the data center. Data turned over to the center is therefore 99 and 44/100ths % "clean" -- and users are software-committed to the center.

- Installing standalone small business systems . . . often a last grasp effort to obtain revenue from a customer going in-house. But many bureaus say the same customers often return for new applications or old ones (e.g. payroll) done more easily by a service organization.

- Turning industry-specific expertise into marketable software packages . . . often for use on hardware sold by the bureau. Losing a services customer may not mean loss of all continuing revenue.

- Getting acquired by or acquiring other bureaus -- consolidation to gain strength and capital to expand, say with network or data base service.

In the long run, as one of the seminar speakers suggested, things may change even more drastically . . . with the surviving service organizations becoming distributors for minicomputers or other hardware in the next few years . . . and evolving into facilities management companies or autotransaction utilities after that. And as customers slowly become accustomed to adjusting their own operations to fit "canned" applications software built into the machines they buy (IAPs) and later into firmware . . . software houses might become microprogramming houses.

But meanwhile, as one cool head at the ADAPSO seminar said about his company's strategy for small business computers: "We must not rush into it, the sky is not falling. Any involvement must evolve from our already established strengths."

So here we have a picture of various forces meeting and competing at the very base of the computing pyramid -- emphasizing sharply the growing competition between hardware, software, and services in data processing tasks. It almost sounds like the competitive environment IBM describes in its trial brief . . . ?

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NASIS report: a self-examination

STATES SLOWLY CONSOLIDATE INFORMATION SYSTEMS MANAGEMENT, WRESTLE WITH PRIVACY
COMPUTER HARDWARE SHIPMENTS LIGHT, EDP SHARE OF OVERALL STATE SPENDING DROPS

> *"The degree of difficulty in applying a 20th century technology to an organizational framework which may have been established during the 18th century is almost unbelievable."*
>
> -- "Overview" in NASIS Report on Information Systems Technology in State Government

The fifty state governments, as an information systems market, have their own peculiar eccentricities . . . and to the National Association for State Information Systems (NASIS), the nature of those quirks is of much concern. And to the taxpayers who foot the bill -- and the citizens whose privacy could be invaded by faulty data processing safeguards -- they should be too.

In an attempt to present an annual "snapshot" of what's going on among the states in information systems trends and technology, NASIS prepares an annual report on practices, policies, and problems concerning data processing within the states. Also included are equipment and applications inventories.

This year's "snapshot," published by the Council of State Governments, points to some significant trends:

- States are increasing their centralized control of DP activities, with all 50 reporting some degree of central control over hardware acquisitions and over planning functions. A lesser amount of control was exhibited over operations and design.

- The total number of computer systems increased only slightly in 1974; most of the increase was attributed to minicomputers. In the overall use of proprietary software packages, there was considerable increase.

- State spending for hardware has dropped to about half of other EDP expenses, and EDP budgets as a whole are dropping in comparison to overall state spending.

- In the area of security and privacy, there is "still a dire need to provide for auditing the security measures which have been established and for installing security plans where they are missing."

- Leasing is still the most prevalent method the states use to obtain computers, but 1974 saw a sharp increase in the percentage of purchased systems -- from 11% to 18% -- reflecting the increased use of minis.

Externally, the biggest headache faced by state DP agencies for the last two years in a row, notes NASIS with dismay, is "Management Understanding." A close second -- and getting worse -- is "Lack of Definitive Plan." Another problem getting worse is, naturally, inadequate financing.

Missed programming schedules ranks as the top internal problem related to information systems . . . while cost overruns is a hard-charging number two. Diminishing in importance are such nettlesome problems as inaccurate output, missed production schedules, or systems designs being too sophisticated.

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STATE AGENCY EDP EXPENDITURES (33 STATES)
FY 1974 (act.) -- FY 1975 (est.)

	Hardw'e	Personn.	Consult.	Softw'e	Other	Total
FY 74	$114.2M	$155.0M	$12.5M	$6.9M	$26.4M	$315.0M
% of Tot.	37%	49%	4%	2%	8%	100%
FY 75	136.7	177.8	12.6	1.7	33.9	362.7
% of Tot.	38%	49%	3%	1%	9%	100%

(Source: NASIS Report on Information Systems Technology in State Government)

Computer inventory . . .

In the 45 states reporting in both 1973 and 1974, the total number of computers installed increased only 3% from 438 to 452 . . . and the general rule was that the smaller the computer, the better chance it had to add to the state population. Overall in 1974, a fifth of the computers at state agencies were classified as "large" by NASIS, more than 70% were "medium" or "small," and almost a tenth were "minicomputers" -- up from 2% the year before.

Over the years from 1971, leasing as a method of procurement has dropped in popularity from 76% of installed systems to 60%, purchase has grown slightly, and mixed lease and purchase (CPU usually on lease) is now the method of procurement in 22% of the installations, up from 8% in 1971.

By computer size, the method of procurement looks like this:

	Large	Medium	Small	Mini
Leased	60%	55%	67%	52%
Purchased	9	16	17	43
Mixed	31	29	16	5

. . . and EDP expenditures

Spending by the various states in fiscal year 1974 averaged a little over $9.5 million per state for all categories of expenditure; and is expected to reach almost $11 million this year. Totals for the states reporting are charted above. The relatively small portion of the budgets going to hardware are attributed to consolidation of hardware, improvement in operations management, changing lease and purchase arrangements, and use of larger computers.

Compared to total state spending, EDP expenditures (excluding higher education) is only .52% of the outlay . . . considerably less than the year before. NASIS attributes this to the affect of revenue sharing, which has increased the total budget, and the increase of purchased to leased systems.

The NASIS report is available from: National Association of State Information Systems, P.O. Box 11910, Lexington, KY 40511. $15.

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• THE DO-IT-YOURSELF CRAZE HAS HIT THE MICROCOMPUTER SECTOR with a new kit from Cramer Electronics. Priced at $495, the kit comes with an assortment of memory, interface circuits, passive components, software, documentation, and either an Intel 8080, Motorola 6800 or Texas Instruments 8080 microprocessor chip . . . all the makings of a functional microcomputer. A 1K bytes Random Access Memory is expandable to 65K, with decoding available for the first 16K bytes; and tiny hexadecimal displays and switches allow for start-up, design test and program writing without expensive I/O devices.

Cramer, with approximately $300,000 invested in the design and development of the kits (by Microcomputer Technique, Inc.), will offer kits based on MOSTEK, AMD, and RCA chips also. Later, bipolar kits will be added to the line. Except for kits used mainly by hobbyists, Cramer claims its products are the first of a kind. The company expects to sell $7 million worth (14,000 units) within their first year of production. And since Cramer says it has identified 25,000 applications for the exploding microprocessor industry . . . somebody has to neophyte designers the bits from bytes . . . .

• SHUNNING MAGNETIC LEDGER CARDS, NCR OFFERS TWO NEW 399s for use with either 4.9 million character disk or 9.8 million character disk (NCR 656). The first model comes with 20K processor memory and tape cassette drive in addition to the disk. The second model comes with that and a new 55 lpm matrix printer. The two models rent for $795 and $995 a month respectively, and both will be available this December. To date NCR says it has over 500 NCR 399s installed in the U.S. and approximately 2000 of the smaller NCR 299s.

• THE IRS MAY HAVE GIVEN A BOOST TO THE COM PEOPLE with a recent ruling that permits general books of account to be retained on microfilm. Previously, microfilm reproduction of tax records was limited to certain supporting data. But before users start chucking their books into the circular file, they must have their systems approved by their IRS District Director.

• A DATA GENERAL C 300 ECLIPSE NETWORK HAS BUMPED AN IBM 370/135 -- but not without some costs. The first DG C 300s to be installed, a total of seven have been sent at Lowe's in North Wilkesboro, NC. Data General claims its computers will "form one of the most advanced distributed data processing systems in private industry, with each processor independent of the others, yet able to share all system resources." The price tag for each, though, is over $99,000. Lowe's will also use DG Novas in 130 of its retail/wholesale stores.

• THE PRIVATE TELEPHONE SUPPLIERS ARE UP IN ARMS AGAIN, riled this time by a set of recommendations to the FCC proffered by the Federal-State Joint Board. The board, comprised of three FCC members and four regulatory utility commissioners, has come out for a certification program for all terminal devices hooked to the Ma Bell net -- but not for business telephone systems (PBX and key). And according to the North American Telephone Association, AT&T's own records show that customer-provided equipment is 15% less troublesome than the telephone company's. Representatives from the five-year old, post-Carterfone independent equipment industry will powwow in Chicago next month to plan their crusade against Goliath.

• MEMOREX IS GETTING INTO TELECOMMUNICATIONS VIA COMPUTER COMMUNICATIONS, INC. Follow-up on a June agreement in principle, the deal has Memorex buying a minimum of $2.5 million of CCI's communications processors, related software, and all future enhancements . . . as well as $450,000 (11%) of CCI's stock.

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